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THE
FRANKLIN
ARITHMETIC.

BY **E. DAVIS, A. M.**
PRINCIPAL OF WESTFIELD ACADEMY.



Dr. Franklin.

"Franklin became a very learned and useful man, by studying while other boys were at play."—See *Appendix*, page 97.

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THE
FRANKLIN INTELLECTUAL
ARITHMETIC:

FOR THE
USE OF SCHOOLS.

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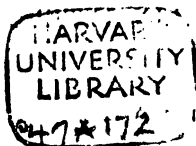
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PRINCIPAL OF WESTFIELD ACADEMY.

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1837.

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PREFACE.



It is a true saying, that the character of an individual is affected by the objects with which he is conversant. Hence it is important that the objects presented to the mind of a child should have an elevating influence, and excite him to aspire to something more excellent than he has already attained. To make children more fond of study, we must throw around them a literary atmosphere. If in their studies they are constantly reminded of raisins and oranges, candy and pears, filberts and cookies, it becomes a difficult task to inspire them with a love for Academus' shades, Helicon's fountain, or Siloa's brook. For this reason, among others, the toy books of children, such as Tom Thumb, Cock Robin, Blue Beard, &c. have been exchanged for the plain, practical, and unvarnished tales of real life.

The system of expurgation that has been exercised over the greater part of school books, it is believed, may advantageously be extended to Arithmetic. We have many excellent Arithmetics for children and youth; but the author, with many others, thinks that it will be an important improvement to substitute questions, the solution of which will convey to the mind some important truth. It seems rather out of place for a teacher to sit down with a pupil to calculate the gain or loss on the sale of gin, or lottery tickets. In one of our excellent and popular books on mathematical science, there are two or three questions which the scholar cannot solve without knowing how many cards there are in a pack. The writer of this has been many times mortified to be asked by a pupil, "How many cards are there in a pack, Sir?" It is believed that a child will be as much interested in calculating the length of a distinguished man's life, the height of a mountain, the motion of a planet, or the reign of a king, as with calculations upon gin, candy, or cards.

Another reason for presenting the public with a new Arithmetic, aside from the elevating influence of questions of a different character, is, there will be a saving of time by fixing in the child's mind the date of an important event, or some interesting fact connected with figures, at the same time he is acquiring skill in the use of numbers.

This book founds all its claims to patronage, and to originality, on the fact, that the questions are connected with truths important to be remembered. Lest it should be said, that the mere fact, that A. B. died at the age of 45, without knowing who A. B. was, can be of no possible use, the author has added an Appendix of Notes, in which such information as may be necessary to give interest to the scholar is briefly mentioned.

The reasons stated above, have induced the author to present the public with this little work, which he has entitled the "FRANKLIN INTELLECTUAL ARITHMETIC," in memory of Dr. Benjamin Franklin, whose education was eminently practical, and who labored for the practical improvement of others.

If this plan meets the approbation of his fellow-teachers and the public, the author proposes to extend the system farther, with the hope of being able to increase the interest in this important branch of learning.

E. D.

Westfield, August, 1832.

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DIRECTIONS TO TEACHERS.

Most of the Chapters are divided into three Sections; the questions in the first of which are usually very simple, while those in the second are more abstruse, and the third most difficult. If the questions in the second or third Sections of any or all of the Chapters, are found too difficult, they may be omitted, till the pupil has solved the questions in Sect. I. of the subsequent Chapters. Some explanations will be necessary, in the Chapters on Fractions, especially for very young scholars. Such explanations can be given verbally, by the teacher, much better than in the book. Besides, regard is to be had to the capacities of different children; and the degree of simplification necessary for one child, might render a book nearly worthless for another, of the same age. It is always better to let the scholar *think* for himself, than that his teacher should think for him; especially is this the case in a study, one great end of which should be the cultivation of the reasoning powers.

FRANKLIN ARITHMETIC.

CHAPTER I.

SIMPLE ADDITION.



SECTION I.

1. How many letters in the word JOHN?
2. How many letters in the word SMITH?
3. How many letters in both names, JOHN and SMITH?
4. How many letters in the two words SUN and STARS?
5. How many letters in the three words GOD MADE MAN?
6. How many straight lines in the letter L?
7. How many in the two letters V and N?
8. How many straight lines in A and N?
9. How many straight lines in V and W?
10. How many straight lines in X and M?
11. How many straight lines in H and A?
12. How many straight lines in E and F?
13. How many straight lines in W, V, and H?
14. How many wheels has a wagon?
15. How many have a wagon and cart?
16. How many have a cart and wheelbarrow?
17. How many have a wagon and wheelbarrow?

18. How many surfaces or sides has a brick ?
19. How many surfaces has a shingle ?
20. How many surfaces have a shingle and brick ?
21. How many corners or angles have a pane of glass and a table ?
22. How many stones are there in three cherries and a plumb ?
23. How many hands have a boy and a clock ?
24. How many hinges on two doors ?
25. How many legs have a chair and a table ?
26. How many horns have a cow and a goat ?
27. How many legs have a sheep and a horse ?
28. How many fingers on both your hands ?
29. How many wings have a fly and a goose ?
30. How many feet has a horse ?
31. How many have a horse and a cow ?
32. How many shoes does it take to make two pairs ?
33. How many joints in one finger and thumb ?
34. Noah and his wife, his three sons, and their wives, were saved in the Ark ; how many in all ?
35. There are two States south of Massachusetts, two north, and one west ; how many States, then, touch Massachusetts ?
36. Connecticut River separates two States, and crosses two ; how many States lie upon the river ?
37. There are three States north of the Ohio River, and two south ; how many States lie upon the river ?
38. There are two lakes in Vermont, two in Maine, and one in New Hampshire ; how many in all ?

39. A house was burnt with three beds in one room, two in another, and one in another; how many beds were burnt?

Figures.

| | | | | | | | | | |
|---------------|---------------|-----------------|--------------------|--------|--------|----------|---------|--------|---------|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 0 |
| one. | two. | three. | four. | five. | six. | seven. | eight. | nine. | cipher. |
| 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | |
| ten. | twenty. | thirty. | forty. | fifty. | sixty. | seventy. | eighty. | ninety | |
| 100 | 200 | 300 | 400 | | | | | | |
| one hundred. | two hundred. | three hundred. | four hundred, &c. | | | | | | |
| 1000 | 2000 | 3000 | 4000 | | | | | | |
| one thousand. | two thousand. | three thousand. | four thousand, &c. | | | | | | |

Value of Figures.

Figures have two values; a *simple* and a *local* value. When a figure stands alone, it has a simple value; as, 2 means simply two; but put a figure on the right of it, and it means *ten* times two, thus—20, twenty; put two figures on the right, and it becomes a *hundred* times two; as, 200, two hundred; if we put three figures on the right, it becomes a *thousand* times two, &c. We read figures thus:—

| | | | | | | | | | | | | |
|-----------|--------------------------|-------------------------|------------------------|-----------------------|-------------------|-----------|------------------------|--------------------|------------|-----------|-------|--------|
| Billions. | Hun. of thous. of mills. | Tens of thous. of mill. | Thousands of millions. | Hundreds of millions. | Tens of millions. | Millions. | Hundreds of thousands. | Tens of thousands. | Thousands. | Hundreds. | Tens. | Units. |
| 3 | 9 | 5 | 2 | 8 | 1 | 9 | 5 | 6 | 7 | 3 | 2 | 4 |

When we name the value of each figure in a line, it is called reading them. We must learn to read figures, or we cannot numerate them.

40. Read the following figures, 348; that is, tell the name of the place that each figure occupies.

41. Read the following; 7456.

42. Read these; 654321.

When we have read a line of figures from right to left, we begin and numerate from left to right; thus we read 321, 1 unit, (one) 2 tens, (twenty) 3 hundred; and then numerate—three hundred and twenty-one.

43. The following figures, 273 pounds, represent the weight of Goliath's armor; what did it weigh?

44. The following figures, 969 years, represent Methuselah's age; how old was he?

45. The following, 46,000 tons, represents the weight of gold and silver in Solomon's temple; how much was it?

46. The following figures represent the number of men that labored seven years to build the temple, 184,600; how many were there?

47. The following figures represent the number of drunkards that die annually in the United States, 30,000; how many?

The Romans made use of the following letters to represent numbers. We use them to number chapters in books, and sections, and sometimes pages.

| | | | | | | | |
|-----|------------|---------|---|----|------------|----------|---|
| I | stands for | one, or | 1 | IV | stands for | four, or | 4 |
| II | | | 2 | V | | | 5 |
| III | | | 3 | VI | | | 6 |

| | |
|---------------------------|--------------------------|
| VII stands for seven or 7 | L stands for fifty or 50 |
| VIII 8 | LX 60 |
| IX 9 | LXX 70 |
| X 10 | LXXX 80 |
| XI 11 | XC 90 |
| XII 12 | C 100 |
| XIII 13 | CC 200 |
| XIV 14 | CCC 300 |
| XV 15 | CCCC 400 |
| XVI 16 | D 500 |
| XVII 17 | DC 600 |
| XVIII 18 | DCC 700 |
| XIX 19 | DCCC 800 |
| XX 20 | DCCCC 900 |
| XXX 30 | M 1000 |
| XL 40 | |

48. Write in figures the number denoted by the following letters, XV.

49. Write these letters in figures, XXIX.

50. Write the following letters in figures, CLV.

51. Massachusetts was settled in M.DC.XX; write the same in figures.

52. America was discovered in the year M.CCCC.XCII; write the same in figures.

53. The declaration of Independence was in the year M.DCC.LXXVI; write the same in figures.

54. Hartford was first settled in M.DC.XXXV; write the same in figures.

55. The Bastille was destroyed in the year M.DCC.LXXXIX; write the same in figures.

56. Rev. J. Rice died in Virginia, September III, M.DCCC.XXXI, aged LIV; write the same in figures.

57. Aug. II, M.DCCC.XXXI, a great fire at Constantinople, that destroyed M.DCCC houses; write the same in figures.

Addition Table.

| | | |
|---------------|---------------|---------------|
| 1 and 2 are 3 | 3 " 4 " 7 | 5 " 6 " 11 |
| 2 " 2 " 4 | 4 " 4 " 8 | 6 " 6 " 12 |
| 3 " 2 " 5 | 5 " 4 " 9 | 7 " 6 " 13 |
| 4 " 2 " 6 | 6 " 4 " 10 | 8 " 6 " 14 |
| 5 " 2 " 7 | 7 " 4 " 11 | 9 " 6 " 15 |
| 6 " 2 " 8 | 8 " 4 " 12 | 10 " 6 " 16 |
| 7 " 2 " 9 | 9 " 4 " 13 | 11 " 6 " 17 |
| 8 " 2 " 10 | 10 " 4 " 14 | 12 " 6 " 18 |
| 9 " 2 " 11 | 11 " 4 " 15 | 1 and 7 are 8 |
| 10 " 2 " 12 | 12 " 4 " 16 | 2 " 7 " 9 |
| 11 " 2 " 13 | 1 and 5 are 6 | 3 " 7 " 10 |
| 12 " 2 " 14 | 2 " 5 " 7 | 4 " 7 " 11 |
| 1 and 3 are 4 | 3 " 5 " 8 | 5 " 7 " 12 |
| 2 " 3 " 5 | 4 " 5 " 9 | 6 " 7 " 13 |
| 3 " 3 " 6 | 5 " 5 " 10 | 7 " 7 " 14 |
| 4 " 3 " 7 | 6 " 5 " 11 | 8 " 7 " 15 |
| 5 " 3 " 8 | 7 " 5 " 12 | 9 " 7 " 16 |
| 6 " 3 " 9 | 8 " 5 " 13 | 10 " 7 " 17 |
| 7 " 3 " 10 | 9 " 5 " 14 | 11 " 7 " 18 |
| 8 " 3 " 11 | 10 " 5 " 15 | 12 " 7 " 19 |
| 9 " 3 " 12 | 11 " 5 " 16 | 1 and 8 are 9 |
| 10 " 3 " 13 | 12 " 5 " 17 | 2 " 8 " 10 |
| 11 " 3 " 14 | 1 and 6 are 7 | 3 " 8 " 11 |
| 12 " 3 " 15 | 2 " 6 " 8 | 4 " 8 " 12 |
| 1 and 4 are 5 | 3 " 6 " 9 | 5 " 8 " 13 |
| " 4 " 6 | 4 " 6 " 10 | 6 " 8 " 14 |

| | | |
|----------------|-----------------|-----------------|
| 7 " 8 " 15 | 1 and 10 are 11 | 7 " 11 " 18 |
| 8 " 8 " 16 | 2 " 10 " 12 | 8 " 11 " 19 |
| 9 " 8 " 17 | 3 " 10 " 13 | 9 " 11 " 20 |
| 10 " 8 " 18 | 4 " 10 " 14 | 10 " 11 " 21 |
| 11 " 8 " 19 | 5 " 10 " 15 | 11 " 11 " 22 |
| 12 " 8 " 20 | 6 " 10 " 16 | 12 " 11 " 23 |
| 1 and 9 are 10 | 7 " 10 " 17 | 1 and 12 are 13 |
| 2 " 9 " 11 | 8 " 10 " 18 | 2 " 12 " 14 |
| 3 " 9 " 12 | 9 " 10 " 19 | 3 " 12 " 15 |
| 4 " 9 " 13 | 10 " 10 " 20 | 4 " 12 " 16 |
| 5 " 9 " 14 | 11 " 10 " 21 | 5 " 12 " 17 |
| 6 " 9 " 15 | 12 " 10 " 22 | 6 " 12 " 18 |
| 7 " 9 " 16 | 1 and 11 are 12 | 7 " 12 " 19 |
| 8 " 9 " 17 | 2 " 11 " 13 | 8 " 12 " 20 |
| 9 " 9 " 18 | 3 " 11 " 14 | 9 " 12 " 21 |
| 10 " 9 " 19 | 4 " 11 " 15 | 10 " 12 " 22 |
| 11 " 9 " 20 | 5 " 11 " 16 | 11 " 12 " 23 |
| 12 " 9 " 21 | 6 " 11 " 17 | 12 " 12 " 24 |



SECTION II.

1. The Earth has 1 moon, and Jupiter has 4; how many have both ?

2. The Earth has 1 moon, and Herschel has 6; how many have both ?

3. A spider has 8 eyes, and a bat has 2; how many have both ?

4. A spider has 8 legs, and an ostrich 2; how many have both ?

5. There are 2 bones in the arm below the elbow, and 1 above; how many in the arm ?

6. Jupiter has 4 moons, and Herschel has 6; how many have both?

7. Jupiter has 4 moons, and Saturn has 7; how many have both?

8. Herschel has 6 moons, and Saturn 7; how many have both?

9. Formerly only 7 planets were known, but 4 more have been discovered; how many are known now?

10. The Earth has 1 moon, Jupiter 4, Saturn 7, and Herschel 6; how many have all?

11. In the battle at Bunker Hill, 10 hundred British were killed, and 4 hundred Americans; how many in all?

12. In the battle at Stillwater, the British lost 5 hundred, and the Americans 4 hundred; how many did both lose?

13. There are 6 New England States, and 5 Middle States; how many of both?

14. 4 of the Southern States border on the Atlantic Ocean, and 3 on the Gulf of Mexico; how many are there in all?

15. George Washington was President of the United States 8 years, and John Adams 4; how long were both of them President?

16. Thomas Jefferson was President 8 years, and James Madison 8; how long were both of them President?

17. 5 of the New England States border on the Atlantic Ocean, and 1 does not; how many in all?

18. Connecticut has 4 counties on the sea shore, and 4 in the interior; how many in all?

19. Connecticut has 8 counties, and Rhode-Island 5; how many counties in both?

20. The Supreme Court of Massachusetts has 4 judges, and the Court of Common Pleas 4; how many have both?

21. There are 3 colleges in Massachusetts, and 3 in Connecticut; how many in both?

22. There are 2 colleges in Vermont, 1 in New Hampshire, 2 in Maine, and 1 in Rhode-Island; how many in all?

23. In England there have been 4 kings named George, and 8 named Henry; how many of both?

24. The Jews had 3 kings before the revolt of the ten tribes, and 13 after the revolt, and before the captivity; how many in all?

25. In the Alphabet there are 19 consonants, and 7 vowels; how many letters in all?

26. A cat has 4 toes on each hind foot, and 4 on each front foot; how many on all its feet?

27. A dog and wolf and fox have 5 toes on the fore foot, and 4 on the hind; how many on both?

28. 20 make a score, and 12 make a dozen; how many make a score and a dozen?

29. Portland has 12 thousand inhabitants, and New Haven 10 thousand; how many have both?

30. Baltimore has 80 thousand, and Trenton 4 thousand; how many have both?

31. An apple-tree blossom has 5 petals (or leaves) and the lilac 1; how many have both?

32. An apple-tree blossom has 5 petals, and the flower of mustard 4; how many have both?

33. The flower of the mustard has 4 petals and the lily 6; how many have both?

34. How many inches round my pocket Bible,

which is three inches long and two inches wide ?



35. How many inches round my spelling book, which is 7 inches long and 4 wide ?

36. How many inches round a pane of glass that is 8 inches long and 6 wide ?

37. How many inches round a pane that is 9 inches long and 7 wide ?

38. How many rods of fence will go round a garden 8 rods long and 4 wide ?

39. How many feet round a table that is 4 feet long and 3 wide ?

40. How many feet round a room that is 20 feet long and ten feet wide ?

41. How many miles round Babylon, which was 15 miles long and 15 wide ?

42. How many yards of binding is needed for a carpet 6 yards long and 4 yards wide ?

43. Josiah was 8 years old when he was made king, and reigned 31 years ; how old was he when he died ?

44. Manasseh was 12 years old when he began to reign, and he reigned 55 years ; how old was he when he died ?

45. In hymns of Common Metre the first line has 8 syllables, and the second 6 ; how many in both ?

46. In Long Metre every line has 8 syllables ; how many in two lines ?

47. In Short Metre the two first and the last lines have 6 syllables each, and the third line has 8 syllables ; how many in a verse ?

SECTION III.

1. Dr. Franklin was born in 1706, and lived 84 years ; in what year did he die ? (See *Appendix*, note A.)

2. Homer lived 9 hundred years before Christ, and Byron 18 hundred after ; how long did Byron live after Homer ? (*App. B, C.*)

3. Adam was 130 years old when Seth was born, and Seth was 105 when Enos was born ; how old was Adam when Enos was born ?

4. Enos was 90 years old when Cainan was born ; how old was Seth at that time ?

5. Cainan was 70 years old when Mahalaleel was born ; how old was Enos at that time ?

6. Washington was 43 years old at the commencement of the American revolution, and lived 24 years after ; how long did he live ? (*App. D.*)

7. When Bonaparte was appointed Emperor, he was 35 years old ; he lived 17 years after ; how old was he when he died ? (*App. E.*)

8. America was discovered in 1492, the first settlement in the United States was made 115 years after ; in what year was the settlement ?

9. The first settlement was made in Virginia in 1607, and the first in Massachusetts 13 years after ; in what year was Massachusetts settled ?

10. In eighteen hundred and thirty-one, 119 persons died of drunkenness in New York, and 137 in Philadelphia ; how many in both ?

11. In 1700, Addison was 28 years old, and lived 19 years after ; how long did he live ? (*App. F.*)

12. Akenside the poet was 29 years old in 1750, and lived after that 20 years ; how long did he live ?

13. 35 of the signers of the declaration of Inde-

pendence died before 1800, and 21 after; how many in all?

14. George III. reigned 16 years before the declaration of the American Independence, and 44 years after; how long did he reign?

15. There were in 1830 in New Hampshire 117 blind persons, and in Maine 157; how many in both?

16. Mahomet was born 571 years after Christ, and Cicero 106 before; how long was the birth of Cicero before that of Mahomet? (*App. G.*)

17. The Olympiads began 776 years before Christ, and ended 25 after; how long did they continue?

18. Cicero died 43 before Christ, and Livy the historian 9 years after; how much time passed between the death of these men? (*App. H, I.*)

19. Sallust died 35 before Christ, and Ovid the poet 17 years after Christ; how much time passed between their deaths? (*App. J, K.*)

20. Virgil the poet died 19 years before Christ, and Strabo 25 after; how many years between their deaths? (*App. L, M.*)

21. Shakespeare died 4 years before the landing of the pilgrims at Plymouth, and Kepler 10 years after; how many years between the deaths of the two? (*App. N, O.*)

22. Martin Luther died 74 years before the landing of the pilgrims at Plymouth, and Galileo 22 years after; how long between? (*App. P, Q.*)

23. The Gunpowder plot was 15 years before the landing of the pilgrims, and the Irish rebellion 21 after; how many years between? (*App. R, S.*)

24. Hudson's Bay was discovered 10 years be-

fore the settlement at Plymouth, and Bagdad was taken by the Turks 18 years after; how long a time passed between?

25. The revolution in Sweden was 4 years before the declaration of American Independence, and the French revolution 13 years after; how many years between them?

26. Dr. Doddridge was 33 years old when Dr. Beattie was born, and died when Beattie was 17; how old was Doddridge when he died? (*App. T. & U.*)

27. Dr. Darwin was 43 years old when the American revolution commenced, and lived 26 years after; how old was he when he died? (*App. V.*)

28. John Elliot was 16 years old when the pilgrims landed at Plymouth, and lived after that 70 years; how old was he when he died? (*App. W.*)

29. Dean Swift was, in 1700, 33 years old, and lived 44 years after; how old was he when he died?

30. Col. J. Gardner was 13 years old in 1700, and lived 45 years; how old was he when he died? (*App. X.*)

CHAPTER II.

SIMPLE SUBTRACTION.



SECTION I.

1. Take E from the word HOPE, and how many letters would be left? and what would it be then?

2. Take E and Y from TURKEY, and h—

many letters will be left ? and what will they spell ?

3. Take from the same word T U R, and how many letters will be left, and what will they spell ?

4. A boy had one finger cut off; how many had he left ?

5. I plucked two leaves from an apple tree blossom; how many were left ?

6. How many feet has a cat more than a goose ?

7. A cow has 2 hoofs on each foot, a horse has but 1; how many more has a cow than a horse ?

8. How many more wheels has a stage than a wheel-barrow ?

9. How many more wheels has a wagon than a cart ?

10. How many more joints in a finger than in a thumb ?

11. How many more lines in the letter M than in V ?

12. How many more lines in W than A ?

13. How many more lines in E than L ?

14. A little girl put out one of her eyes with a fork; how many had she left ?

15. A boat upset upon the pond, and five boys plunged in the water; two were taken out alive; how many were drowned ?

16. A man had seven children; two of them were killed by the fall of a tree; how many had he left ?

17. A man had five children; the Indians carried off three; how many were left ?

18. A boy played three days in a week; how many did he work ?

19. A boy was sick, in February, a fortnight; how many weeks was he well ?

20. I had five pear trees, and the wind blew down two ; how many were left ?

21. I went to school five months, during one year, and worked the rest of the time ; how many months did I work ?

22. Four rivers ran through the garden of Eden, and one through Babylon ; how many more ran through Eden than Babylon ?

23. How many more sons had Jacob than Noah ?

24. Eight persons were saved in the ark, four of whom were males ; how many females ?

25. Ten of the twelve tribes of Israel revolted ; how many were left ?

26. A rose leaf has five little leaves, and a clover has three ; how many more has the rose ?

27. Five States border upon Massachusetts and three upon New Hampshire ; how many more border upon Massachusetts ?

28. Six States border upon Pennsylvania, and one upon Maine ; how many more border upon Pennsylvania ?

29. Sugar is twelve cents a pound, and pearl-ash ten ; how much more for the sugar ?

30. A boy had twelve cents, and lost four ; how many had he left ?

31. A hen had eight chickens, but the cat killed three ; how many were left ?

32. Judas, one of the twelve apostles, hung himself ; how many were there left ?

33. A cubit is eighteen inches, and a foot twelve ; how much shorter is a foot than a cubit ?

34. Shem, the son of Noah, had nine sons, and Japheth seven ; how many more had Shem ?

35. Japheth had seven sons, and Ham four; how many more had Japheth?

36. Jacob had 12 sons, and his brother Esau 5; how many more had Jacob?

37. Jesse, David's father, had 7 sons and three daughters; how many more sons than daughters?

38. Judah, a son of Jacob, had 5 sons, and his brother Levi 3; how many more had Judah?

39. "And Shimei had 16 sons and 6 daughters;" (1 Chron. iv. 27.) how many more sons than daughters?

40. David took from Hadarezer "7 thousand horsemen and 20 thousand footmen;" (1 Chron. xviii. 4.) how many more footmen?

41. The famine, when Joseph was in Egypt, continued 7 years, and in the days of Elijah 3; how much longer was the famine in Egypt?

42. If a woman have 10 pieces of silver, and lose one, how many will be left? (Luke xv. 8.)

43. Solomon made pillars in the temple 35 cubits high, and chapiters on the top 5 cubits (2 Chron. iii. 15.); how much longer was the pillar than the chapiters?

44. The Dead Sea is 16 miles wide, and the Sea of Galilee 5; how much wider is the Dead Sea?

Subtraction Table.

| | | |
|-------------------|-------------------|-------------------|
| 1 from 2 leaves 1 | 1 from 8 leaves 7 | 2 from 3 leaves 1 |
| 1 " 3 " 2 | 1 " 9 " 8 | 2 " 4 " 2 |
| 1 " 4 " 3 | 1 " 10 " 9 | 2 " 5 " 3 |
| 1 " 5 " 4 | 1 " 11 " 10 | 2 " 6 " 4 |
| 1 " 6 " 5 | 1 " 12 " 11 | 2 " 7 " 5 |
| 1 " 7 " 6 | 1 " 13 " 12 | 2 " 8 " 6 |

| | | | | | | | | | | | | | | |
|---|------|----|--------|----|---|------|----|--------|----|----|------|----|--------|----|
| 2 | " | 9 | " | 7 | 5 | " | 7 | " | 2 | 7 | " | 16 | " | 9 |
| 2 | " | 10 | " | 8 | 5 | " | 8 | " | 3 | 7 | " | 17 | " | 10 |
| 2 | " | 11 | " | 9 | 5 | " | 9 | " | 4 | 7 | " | 18 | " | 11 |
| 2 | " | 12 | " | 10 | 5 | " | 10 | " | 5 | 7 | " | 19 | " | 12 |
| 2 | " | 13 | " | 11 | 5 | " | 11 | " | 6 | 8 | from | 9 | leaves | 1 |
| 2 | " | 14 | " | 12 | 5 | " | 12 | " | 7 | 8 | " | 10 | " | 2 |
| 3 | from | 4 | leaves | 1 | 5 | " | 13 | " | 8 | 8 | " | 11 | " | 3 |
| 3 | " | 5 | " | 2 | 5 | " | 14 | " | 9 | 8 | " | 12 | " | 4 |
| 3 | " | 6 | " | 3 | 5 | " | 15 | " | 10 | 8 | " | 13 | " | 5 |
| 3 | " | 7 | " | 4 | 5 | " | 16 | " | 11 | 8 | " | 14 | " | 6 |
| 3 | " | 8 | " | 5 | 5 | " | 17 | " | 12 | 8 | " | 15 | " | 7 |
| 3 | " | 9 | " | 6 | 6 | from | 7 | leaves | 1 | 8 | " | 16 | " | 8 |
| 3 | " | 10 | " | 7 | 6 | " | 8 | " | 2 | 8 | " | 17 | " | 9 |
| 3 | " | 11 | " | 8 | 6 | " | 9 | " | 3 | 8 | " | 18 | " | 10 |
| 3 | " | 12 | " | 9 | 6 | " | 10 | " | 4 | 8 | " | 19 | " | 11 |
| 3 | " | 13 | " | 10 | 6 | " | 11 | " | 5 | 8 | " | 20 | " | 12 |
| 3 | " | 14 | " | 11 | 6 | " | 12 | " | 6 | 9 | from | 10 | leaves | 1 |
| 3 | " | 15 | " | 12 | 6 | " | 13 | " | 7 | 9 | " | 11 | " | 2 |
| 4 | from | 5 | leaves | 1 | 6 | " | 14 | " | 8 | 9 | " | 12 | " | 3 |
| 4 | " | 6 | " | 2 | 6 | " | 15 | " | 9 | 9 | " | 13 | " | 4 |
| 4 | " | 7 | " | 3 | 6 | " | 16 | " | 10 | 9 | " | 14 | " | 5 |
| 4 | " | 8 | " | 4 | 6 | " | 17 | " | 11 | 9 | " | 15 | " | 6 |
| 4 | " | 9 | " | 5 | 6 | " | 18 | " | 12 | 9 | " | 16 | " | 7 |
| 4 | " | 10 | " | 6 | 7 | from | 8 | leaves | 1 | 9 | " | 17 | " | 8 |
| 4 | " | 11 | " | 7 | 7 | " | 9 | " | 2 | 9 | " | 18 | " | 9 |
| 4 | " | 12 | " | 8 | 7 | " | 10 | " | 3 | 9 | " | 19 | " | 10 |
| 4 | " | 13 | " | 9 | 7 | " | 11 | " | 4 | 9 | " | 20 | " | 11 |
| 4 | " | 14 | " | 10 | 7 | " | 12 | " | 5 | 9 | " | 21 | " | 12 |
| 4 | " | 15 | " | 11 | 7 | " | 13 | " | 6 | 10 | fr. | 11 | leaves | 1 |
| 4 | " | 16 | " | 12 | 7 | " | 14 | " | 7 | 10 | " | 12 | " | 2 |
| 5 | from | 6 | leaves | 1 | 7 | " | 15 | " | 8 | 10 | " | 13 | " | 3 |

| | | |
|--------------------|--------------------|--------------|
| 10 " 14 " 4 | 11 " 14 " 3 | 12 " 14 " 2 |
| 10 " 15 " 5 | 11 " 15 " 4 | 12 " 15 " 3 |
| 10 " 16 " 6 | 11 " 16 " 5 | 12 " 16 " 4 |
| 10 " 17 " 7 | 11 " 17 " 6 | 12 " 17 " 5 |
| 10 " 18 " 8 | 11 " 18 " 7 | 12 " 18 " 6 |
| 10 " 19 " 9 | 11 " 19 " 8 | 12 " 19 " 7 |
| 10 " 20 " 10 | 11 " 20 " 9 | 12 " 20 " 8 |
| 10 " 21 " 11 | 11 " 21 " 10 | 12 " 21 " 9 |
| 10 " 22 " 12 | 11 " 22 " 11 | 12 " 22 " 10 |
| 11 ft. 12 leaves 1 | 11 " 23 " 12 | 12 " 23 " 11 |
| 11 " 13 " 2 | 12 ft. 13 leaves 1 | 12 " 24 " 12 |



SECTION II.

1. There are 4 bones in one finger, and 3 in the thumb; how many more in a finger than a thumb?

2. There have been 7 presidents of the United States; 3 only are living; how many are dead?

3. Jacob had 12 sons; when Benjamin died how many were living?

4. In the battle of Bunker Hill, 10 hundred British were killed, and 4 hundred Americans; how many more British than Americans?

5. There are 14 counties in Massachusetts, and 8 in Connecticut; how many has one more than the other?

6. Israel had 18 kings before the captivity, and Judah 13; how many more had Israel?

7. 19 letters in the Alphabet are consonants, and 7 are vowels; how many more consonants than vowels?

8. Washington was president 8 years, and

Adams 4; how much longer was one President than the other?

9. There are 39 books in the Old Testament, and 27 in the New; how many more in the Old?

10. Saturn has 7 moons, and Jupiter 4; how many more has Saturn?

11. Herschel has 6 moons, and the earth 1; how many more has Herschel?

12. The rose leaf has 7 little leaves, and clover 3; how many more has the rose?

13. The camel has 34 teeth, and the lama 30; how many more has the camel?

14. The camel has 18 teeth in the lower jaw, and 16 in the upper; how many more in the lower?

15. The lama has 16 teeth in the lower jaw, and 14 in the upper; how many more in the lower?

16. A cat has 30 teeth, and a dog 42; how many more has a dog?

17. A cat has 8 toes on its front feet, and 6 on its hind; how many more on its front?

18. The wolf and dog have 22 teeth in the lower jaw, and 20 in the upper; how many more in the lower?

19. 8 quarts make a peck, and 4 make a gallon; how many more in a peck?

20. 20 make a score, and 12 make a dozen; how many more in a score than a dozen?

21. The river Amazon is 4 thousand miles long, and the Ohio 1 thousand; how much longer is the Amazon?

22. The river Mississippi is 30 hundred miles

long, and the Ohio 10 hundred ; how much longer is the Mississippi ?

23. The Senegal is 9 hundred miles long ; how much longer is the Ohio ?

24. How much longer is the Mississippi than the Senegal ?

25. The river Nile is 20 hundred miles long ; how much longer is it than the Ohio ?

26. The Connecticut is 4 hundred miles long ; how much longer is the Nile ?

27. The Senegal is 9 hundred miles long ; how much longer is it than the Connecticut ?



SECTION III.

1. Dr. Franklin was born in 1706, and Frederic the Great in 1712 ; how old was Franklin when Frederic was born ? (*Appendix A.*)

2. Edmund Burke was born 1730 ; how old was Franklin when Burke was born ? (*App. B.*)

3. Dr. Franklin died in 1790 ; how old was he when he died ?

4. Lord Byron was born in 1788, and died in 1824 ; how old was he when he died ?

5. George Washington was first chosen President of the United States in 1789 ; how long was it before Franklin died ?

6. How old was Byron when Washington was first chosen President ?

7. William Pitt was born in 1759, and died in 1806 ; how old was he when he died ? (*App. C.*)

8. How long from the birth of Franklin to the death of Pitt ?

9. Independence was declared July 4th, 1776,

and Adams and Jefferson died July 4th, 1826 ; how long did they live after Independence was declared ?

10. Frederic the Great died in 1786 ; how old was he when he died ?

11. How many years longer did Franklin live than Frederic ?

12. Washington was born in 1732, and died in 1799 ; how old was he when he died ?

13. How much older was Franklin when he died than Washington ?

14. Franklin signed the Declaration of Independence in 1776, and was born in 1706 ; how old was he then ?

15. Washington was appointed Commander in Chief of the United States army, in 1775 ; how old was he at that time ?

16. Bonaparte was born in 1769 ; how old was he when Washington died ?

17. Bonaparte was declared Emperor in 1804 ; how old was he at that time ?

18. Moses led the Israelites through the Red Sea 1491 years before Christ, and died 1451 ; how long did he live after crossing the Red Sea ?

19. John Baptist was beheaded after Christ 32 years, and the book of Revelation was written in 87 ; how long after John was beheaded ?

20. Adam was 930 years' old when he died, and 130 when Seth was born ; how old was Seth when Adam died ?

21. Seth was 912 years old when he died ; how long did he live after the death of Adam ?

22. Seth was 105 years old when Enos was born ; how old was Enos when Seth died ?

23. Enoch was 365 years old when he was translated, and 65 when Methusaleh was born ; how old was Methusaleh when his father was translated ?

24. Alexander the Great was born 356 years before Christ, and his father Philip was murdered 336 before Christ ; how old was Alexander when his father died ? (*App. D.*)

25. Alexander conquered Tyre 322 years before Christ ; how old was he at that time ?

26. The city of Rome had 327 thousand inhabitants, one hundred and sixty years before Christ ; one hundred years previous to that, it had but 292 thousand ; how much increase in one hundred years ?

27. The United States had, in eighteen hundred and thirty, a population of 13 millions, and in seventeen hundred and ninety, 4 millions ; how much did the population increase ?

28. In eighteen hundred and thirty, we had in the United States 2000 thousand slaves, but in seventeen hundred ninety, only 100 thousand ; how much did the slave population increase ?

29. In eighteen hundred and thirty, there were in the United States, 21 hundred negroes one hundred years old, and 5 hundred whites ; how many more negroes than whites ?

30. George IV. King of England, reigned 10 years, and George III. 60 ; how much longer was his reign ?

CHAPTER III.

ADDITION AND SUBTRACTION.



[*Notes.* The first and second sections of this chapter are omitted.]

SECTION III.

1. Samuel Butler was born in 1612, and died in 1680; his age was 16 years less than Dr. Franklin's; how old was Franklin? (*Append. A.*)

2. Dr. Beattie was born in 1735, and died in 1803; John Eliot, the Indian missionary, lived to be 18 years older than Beattie; how old was Eliot?

3. Dr. Watts was born in 1674, and died in 1748; Sir Isaac Newton lived to be 11 years older; how old was Newton? (*Appendix, B, C.*)

4. Miss Fanny Woodbury was born in 1791, and died in 1814; Miss Hannah Adams lived to be 53 years older; how old was Hannah Adams? (*App. D, E.*)

5. Samuel J. Mills died in 1813, aged 35; Henry Martyn was 2 years old when Mills was born; in what year was Martyn born? (*App. F, G.*)

6. John Milton was born in 1608, and died when he was 66 years old; he published his *Paradise Lost* 7 years before he died; in what year did he publish it? (*Appendix, H.*)

7. Sir William Jones, a celebrated scholar, was born in Wales, in 1746, and died at the age of 48, which was 11 years after the close of the Ameri-

can Revolution ; in what year did the Revolution close ? (*App. I.*)

8. Dr. Samuel Johnson died one year after the close of the American Revolution, and was 75 years old ; in what year was he born ? (*App. J.*)

9. John Howard, a very benevolent man, died 7 years after the close of the American Revolution, aged 63 ; in what year was he born ? (*Ap. K.*)

10. William Cowper was born in 1731, and died at the age of 69 ; he published his poem called the Task, 13 years before he died ; in what year did he publish it ? (*App. L.*)

11. The African Slave Trade commenced in the year 1500 ; the first settlement was made at Plymouth, Mass. 120 years after ; in what year was Plymouth settled ? A settlement was begun at Jamestown, Va. 13 years before the one at Plymouth ; in what year commenced the settlement at Jamestown ?

12. The American Colonization Society was formed in 1816 ; a law was enacted by the British Parliament 9 years previous, abolishing the Slave Trade in the British Empire ; in what year was it abolished ?

13. Peter the Great died just 50 years before the Revolutionary war commenced (1775), and was, at his death, 53 years old ; in what year was he born ? (*App. M.*)

14. Charles XII. was born 10 years after Peter the Great, and died at the age of 36 ; in what year was he born, and in what year did he die ? (*Appendix, N.*)

15. Wickliff, in 1350, was 26 years old, and lived after that 34 years ; in what year was he

born ? in what year did he die ? how old was he ?
(*App. O.*)

16. In the year 300, Constantine was 29 years old; in what year was he born ? he lived 37 years after A. D. 800 ; in what year did he die, and at what age ? (*App. P.*)

[*Note.* A. D. stands for *Anno Domini*, which means in the year of our Lord. A. D. 300 means in the 300th year from the birth of our Saviour.]

17. Cicero was born 106 years before Christ, and died when he was 63 ; in what year did he die ?

18. Pompey was born the same year that Cicero was, and died 5 years sooner ; in what year did he die, and at what age ? (*App. Q.*)

19. The famous battle at the pass of Thermopylæ was fought 480 years before Christ ; Pericles was then 18 years old, and died after the battle 51 years ; how old was he ? in what year was he born ? in what year did he die ?

20. Plato was born the next year after Pericles died, and lived to be 80 years old ; in what year was he born ? and in what year did he die ? (*App. R, S.*)

21. Plato was 43 years old when Aristotle was born ; in what year was he born ? (*App. T.*)

22. Aristotle died 26 years after Plato ; in what year did he die ? how old was Aristotle when he died ?

23. The Great Plague was at Athens 430 before Christ ; Xenophon was then 19 years old ; in what year was he born ? (*App. U.*)

24. Xenophon died 359 years before Christ ; how old was he when he died ?

25. Philip of Macedon was, in the year 348, when Plato died, 35 years old; in what year was he born? (*App. V.*)

26. Philip lived after Plato's death 12 years; in what year did he die? and how old was he?

27. Alexander was 8 years old when Plato died; in what year was he born? he died aged 32; in what year did he die?

28. The Greek Olympiads began 776 years before Christ, and 24 years before the building of the city of Rome; in what year was Rome built?

29. The Olympiads ended 25 years after Christ; how many years did they continue?

30. Byzantium, now called Constantinople, was founded 94 years after Rome; in what year was it founded?

31. Carthage was built 17 years before Rome; in what year was it built? it was destroyed 723 years after; in what year was it destroyed?

32. Jeremiah the prophet died 172 years after the foundation of Rome; in what year did he die? Cyrus was then 1 year old; in what year was Cyrus born?

33. Cyrus took Babylon in the year 538; how old was he at that time? he lived 9 years after the fall of Babylon; how old was he when he died? (*App. W.*)

CHAPTER IV.

SIMPLE MULTIPLICATION.



SECTION I.

1. There are 3 bones in one thumb ; how many in 2 ?
2. There are 4 bones in one finger ; how many in 2 ? in 3 ? in 4 ?
3. One chestnut burr contains 3 chestnuts ; how many in 3 burrs ? in 4 ?
4. One clover-leaf is composed of three small leaves ; 6 are composed of how many ?
5. One rose-leaf is composed of 7 small leaves ; of how many are 2 composed ? 3 ? 4 ?
6. One apple-tree blossom has 5 petals ; how many petals have 2 ? 3 ? 4 ?

Table.

| | | | | |
|-----------------------|------|-----------|------|------------|
| 10 mills (<i>m</i>) | make | 1 cent, | sign | <i>ct.</i> |
| 10 cents | " | 1 dime, | " | <i>d.</i> |
| 10 dimes | " | 1 dollar, | " | <i>\$</i> |
| 10 dollars | " | 1 eagle, | " | <i>E.</i> |

7. How many mills in 2 cents ? in 5 ? in 6 ?
8. How many cents in three dimes ? in 7 ?

Table.

| | | | | |
|----------------------------|------|-------------|------|-----------------------|
| 4 farthings (<i>qr.</i>) | make | 1 penny, | sign | <i>d.</i> |
| 12 pence | " | 1 shilling, | " | <i>s.</i> |
| 20 shillings | " | 1 pound, | " | <i>£</i> or <i>l.</i> |

9. How many farthings in 2 pence? in 4? in 5?

10. How many pence in 2 shillings?

11. One spider has 8 eyes; how many have 2?

12. One fly has 6 legs; how many have 3?

13. How many eyes have 5 birds? 6?

14. How many feet have 3 squirrels? 4?

15. How many legs have five tables?

16. How many wheels have 6 carts?

17. How many wheels have 6 wagons?

18. One brig has two masts; how many have 4? 5? 6?

19. One ship has 3 masts; how many have 3? 4? 5?

20. A cow's foot has 2 hoofs; how many hoofs on 4 feet?

21. A watch has 2 hands; how many hands have 6 watches?

22. A pink has 5 petals; how many have 3? 4?

23. A violet has 5 petals; how many have 6?

24. A brick has 6 surfaces; how many have 2 bricks? 3?

25. There are 3 barley-corns in one inch; how many in 4? in 7? in 9?

26. There are 3 feet in a yard; how many in 5? in 6? in 8?

27. There are 2 pints in a quart; how many in 3? in 4? in 6?

28. There are 7 days in 1 week; how many in 2? in 3?

29. There are 4 weeks in 1 month; how many in 3? in 5?

30. There are 12 inches in 1 foot; how many in 2?

Multiplication Table.

| | | |
|-----------------|-----------------|-----------------|
| 2 times 1 are 2 | 4 " 7 " 28 | 7 times 1 are 7 |
| 2 " 2 " 4 | 4 " 8 " 32 | 7 " 2 " 14 |
| 2 " 3 " 6 | 4 " 9 " 36 | 7 " 3 " 21 |
| 2 " 4 " 8 | 4 " 10 " 40 | 7 " 4 " 28 |
| 2 " 5 " 10 | 4 " 11 " 44 | 7 " 5 " 35 |
| 2 " 6 " 12 | 4 " 12 " 48 | 7 " 6 " 42 |
| 2 " 7 " 14 | 5 times 1 are 5 | 7 " 7 " 49 |
| 2 " 8 " 16 | 5 " 2 " 10 | 7 " 8 " 56 |
| 2 " 9 " 18 | 5 " 3 " 15 | 7 " 9 " 63 |
| 2 " 10 " 20 | 5 " 4 " 20 | 7 " 10 " 70 |
| 2 " 11 " 22 | 5 " 5 " 25 | 7 " 11 " 77 |
| 2 " 12 " 24 | 5 " 6 " 30 | 7 " 12 " 84 |
| 3 times 1 are 3 | 5 " 7 " 35 | 8 times 1 are 8 |
| 3 " 2 " 6 | 5 " 8 " 40 | 8 " 2 " 16 |
| 3 " 3 " 9 | 5 " 9 " 45 | 8 " 3 " 24 |
| 3 " 4 " 12 | 5 " 10 " 50 | 8 " 4 " 32 |
| 3 " 5 " 15 | 5 " 11 " 55 | 8 " 5 " 40 |
| 3 " 6 " 18 | 5 " 12 " 60 | 8 " 6 " 48 |
| 3 " 7 " 21 | 6 times 1 are 6 | 8 " 7 " 56 |
| 3 " 8 " 24 | 6 " 2 " 12 | 8 " 8 " 64 |
| 3 " 9 " 27 | 6 " 3 " 18 | 8 " 9 " 72 |
| 3 " 10 " 30 | 6 " 4 " 24 | 8 " 10 " 80 |
| 3 " 11 " 33 | 6 " 5 " 30 | 8 " 11 " 88 |
| 3 " 12 " 36 | 6 " 6 " 36 | 8 " 12 " 96 |
| 4 times 1 are 4 | 6 " 7 " 42 | 9 times 1 are 9 |
| 4 " 2 " 8 | 6 " 8 " 48 | 9 " 2 " 18 |
| 4 " 3 " 12 | 6 " 9 " 54 | 9 " 3 " 27 |
| 4 " 4 " 16 | 6 " 10 " 60 | 9 " 4 " 36 |
| 4 " 5 " 20 | 6 " 11 " 66 | 9 " 5 " 45 |
| 4 " 6 " 24 | 6 " 12 " 72 | 9 " 6 " 54 |

| | | |
|-------------------|-------------------|-------------------|
| 9 " 7 " 63 | 10 " 9 " 90 | 11 " 11 " 121 |
| 9 " 8 " 72 | 10 " 10 " 100 | 11 " 12 " 132 |
| 9 " 9 " 81 | 10 " 11 " 110 | 12 times 1 are 12 |
| 9 " 10 " 90 | 10 " 12 " 120 | 12 " 2 " 24 |
| 9 " 11 " 99 | 11 times 1 are 11 | 12 " 3 " 36 |
| 9 " 12 " 108 | 11 " 2 " 22 | 12 " 4 " 48 |
| 10 times 1 are 10 | 11 " 3 " 33 | 12 " 5 " 60 |
| 10 " 2 " 20 | 11 " 4 " 44 | 12 " 6 " 72 |
| 10 " 3 " 30 | 11 " 5 " 55 | 12 " 7 " 84 |
| 10 " 4 " 40 | 11 " 6 " 66 | 12 " 8 " 96 |
| 10 " 5 " 50 | 11 " 7 " 77 | 12 " 9 " 108 |
| 10 " 6 " 60 | 11 " 8 " 88 | 12 " 10 " 120 |
| 10 " 7 " 70 | 11 " 9 " 99 | 12 " 11 " 132 |
| 10 " 8 " 80 | 11 " 10 " 110 | 12 " 12 " 144 |

SECTION II.

Long Measure.

| | | |
|-----------------------|---------------|----------|
| 3 barley-corns (b.c.) | makes 1 inch, | sign in. |
| 12 inches | " 1 foot | " ft. |
| 3 feet | " 1 yard | " yd. |
| 5½ yards | " 1 rod | " rd. |
| 16½ feet | " 1 rod | " " |
| 40 rods | " 1 furlong | " fur. |
| 8 furlongs | " 1 mile | " m. |

1. How many barley-corns in 1 foot ?
2. How many inches in 1 yard ?
3. How many inches in 3 feet ?
4. How many yards in 2 rods ?
5. How many furlongs in 3 miles ?
6. It is 6 miles from Jerusalem to Bethlehem ;
how many furlongs ?
7. If a window has three panes in width, and
4 in length, how many panes in the window ?

8. If a window has 4 panes in width, and 6 in length, how many in all?

9. If a window has 5 panes in width, and 8 in length, how many in all?

10. If a board be 1 foot wide, and 5 feet long, it may be sawed into how many pieces each 1 foot wide and one foot long?

[*Note.* 1 foot wide and 1 foot long is a square foot; instead of asking how many such pieces it can be sawed into, we may ask, how many square feet it contains.]

11. How many square feet in a board 2 feet wide and 4 feet long?

12. If a board be 10 feet long, and 4 feet wide, how many square feet?

13. If a board be 12 feet long, and 5 feet wide, how many square feet does it contain?

14. If a table be 4 feet long, and 3 feet wide, how many square feet does it contain?

15. If a pane of glass be 9 inches long, and 7 wide, how many square inches does it contain?

16. If a pane of glass be 14 inches long, and 10 wide, how many square inches does it contain?

17. If you fold a sheet of paper so as to make 8 leaves, how many leaves will 7 sheets make? how many 8?

18. If you fold a sheet of paper so as to make 12 leaves, how many leaves will 5 sheets make? how many 6?

19. If you fold a sheet of paper so as to make 16 leaves, how many leaves will 2 sheets make? 3 sheets?

Table.

| | | | |
|-------------|------|----------------|-----------------|
| 4 nails (n) | make | 1 quarter, | sign <i>qr.</i> |
| 4 quarters | " | 1 yard, | " <i>yd.</i> |
| 3 quarters | " | 1 ell Flemish, | " <i>s. F.</i> |
| 5 " | " | 1 ell English, | " <i>s. E.</i> |
| 6 " | " | 1 ell French, | " <i>s. Fr.</i> |

20. How many nails in 2 quarters ? in 5 ? in 6 ?
21. How many nails in an ell French ?
22. How many quarters in one ell French ?
in 3 ? in 6 ?
23. How many quarters in 6 ells English ?
in 8 ?
24. How many quarters in 8 ells Flemish ?
in 10 ?
25. 9 inches make 1 quarter ; how many inches
in a yard ?
26. How many inches in an ell Flemish ? in
an ell English ? in an ell French ?
27. If you sleep 6 hours in one night, how
many hours do you sleep in 4 ? in 6 ?
28. If you sleep 8 hours in one night, how
many do you sleep in 7 ? in 9 ? in 10 ?
29. If you sleep 10 hours in one night, how
many in 8 ? in 9 ? in 12 ?
30. If 1 boy sleeps 3 hours in one night
longer than another, how much more will he sleep
in 5 nights ? in 6 ?
31. If you give 2 cents for using a book one
week, how much for using it 6 ? 8 ? 9 ?
32. If you give 6 cents for using 1 dollar a year,
what will you give for using 3 ? for using 4 ?
5 ? 6 ?
33. If you give 6 cents for using 1 dollar, what
will you give for using 10 dollars ? 20 ?

34. If you give 5 cents for using 1 dollar a year, what will you give for using 5? 7? 9?

[*Notes.* Money given for the use of money is called *interest*: 6 cents for 100 cents, or 6 dollars for 100 dollars, is called 6 *per cent.*: 5 cents for 100, is called 5 *per cent.*; and 7 cents for 100 is called 7 *per cent.*]

35. If the interest of 1 hundred dollars be 5, what is the interest of 4 hundred? 6 hundred?

36. If the interest of 1 hundred dollars for 1 year be 6 dollars, what will it be for 2 years? for 4 years? for 6 years?

37. 12 make a dozen; 3 dozen are how many?

38. 20 make 1 score; Wickliff lived to be 3 score years old; how old was he when he died?

Time.

| | | | |
|--------------------------------------|-----------|--------------|----------------|
| 60 seconds | make | 1 minute, | sign <i>m.</i> |
| 60 minutes | " | 1 hour, | " <i>h.</i> |
| 24 hours | " | 1 day, | " <i>d.</i> |
| 7 days | " | 1 week, | " <i>w.</i> |
| 2 weeks | " | 1 fortnight, | " <i>fort.</i> |
| 4 weeks | " | 1 month, | " <i>mon.</i> |
| 13 weekly months, or 12 calendar, | } 1 year, | | " <i>y.</i> |

39. How many days in 4 weeks?

40. How many weeks in 1 year?

41. How many months in 2 years?

42. How many hours in 2 days?



SECTION III

1. A man of Gath, mentioned in 1 Chron. xx. 6. had 6 fingers on each hand, and 6 toes on each foot; how many fingers and toes had he?

2. Solomon made 3 hundred shields, and each

shield contained 3 hundred shekels of gold ; how much gold in all the shields ? 2 Chron. ix. 16.

3. "Adonibezek said, 3 score and 10 kings, having their thumbs and their great toes cut off, gather their meat under my table" (Judges i. 7.); how many thumbs and toes did Adonibezek cut off ?

4. 12 thousand from each of the 12 tribes were sealed (Rev. vii.); how many in all ?

5. Noah's ark was 3 hundred cubits long ; 1 cubit is 18 inches ; how many inches long was the ark ?

6. There are four years in a Greek Olympiad ; how many in 50 Olympiads ?

7. A steam boat moves usually 10 miles an hour ; how far in 24 hours ? in 28 ? in 30 ?

8. A canal boat moves about 4 miles an hour ; how far will it go in 15 hours ? in 24 ?

9. A ship usually sails in long voyages 100 miles a day ; how far will it sail in 10 days ? in 15 ? in 24 ? in 80 ?

10. A stage travels about 6 miles an hour ; how far in 14 hours ? in 15 ? in 20 ? in 30 ?

11. A man travels about 3 miles an hour ; how far in 24 hours ? in 30 ?

12. A bird can fly 60 miles an hour ; how far in 10 hours ? in 12 ? in 15 ?

13. The water of some rivers runs 4 miles an hour ; how far in 13 hours ? in 16 ? in 20 ?

14. A gentle wind moves 7 miles an hour ; how far in 13 hours ? in 15 ? in 16 ? in 20 ?

15. In a hurricane of the temperate zone, the wind moves 40 miles in an hour : how far in 4 hours ? in 6 ? in 8 ? in 10 ?

16. In a hurricane of the torrid zone, the wind moves 80 miles an hour ; how far in 2 hours ? in 3 ? in 4 ? in 6 ?

17. John M. Mead was 5 years old when he died, and Dr. Isaac Watts 15 times older ; how old was Dr. Watts ? (*App. A.*)

18. Fanny Woodbury died at the age of 23 ; Cowper was 3 times older ; how old was he ?

19. Samuel J. Mills died at the age of 35, and Dryden the poet was *twice* as old ; how old was he ?

20. Thomas Spencer died at the age of 21, and Howard the philanthropist was 3 times older ; how old was Howard ? (*App. B.*)

21. John Urquhart died at the age of 18 ; Locke the philosopher was 4 times older ; how old was Locke ? (*App. C, D.*)

22. Pollok the poet died at the age of 28, and Franklin was 3 times older ; how old was Franklin ? (*App. E.*)

23. Caroline Smelt died at the age of 17 ; Edmund Burke, the British orator, was 4 times older ; how old was Burke ? (*App. F.*)

24. The American Revolutionary war was 8 years long, and the three Punic wars 6 times longer ; how long were they ?

25. If a ship should sail 120 miles in a day, it would sail from New York to London in 30 days ; how far is it ?

26. If a ship should sail from New York to Constantinople in 50 days, it must move at the rate of 108 miles a day ; how far is it ?

27. If a ship should sail 150 miles in a day for 30 days, how far would it sail ?

28. If a ship should sail 30 days, 150 miles a day, it would go from New York to Rome; how far is it?

29. If a ship should sail from Boston for St. Helena, 100 miles a day, it would not arrive there until the end of 60 days; how far is it?

30. If a ship should sail 105 miles a day for 12 days, it would go from New York to Cuba; how far is it?

31. If a ship should sail 70 miles a day, it would go from Boston to New York in 5 days; how far is it?

32. If a ship should sail 70 miles a day, it will go from Boston to Halifax in 10 days; how far is it?

33. In the battle of Agincourt, in France, 20 thousand men were slain; Hannibal in sixteen years destroyed 15 times as many; how many did he destroy? (*App. G.*)

34. In the battle of Bunker Hill, the Americans lost 400 killed; in the battle at Cannæ, the Romans lost 100 times as many; how many did they lose?

35. Alexander the Great continued his conquests 12 years; the crusades were continued 16 times as many; how long did they continue?

CHAPTER V. SIMPLE DIVISION.

SECTION I.

Division Table.

| | | |
|----------------|----------------|----------------|
| 2 in 2 1 time. | 4 in 4 1 time. | 6 in 6 1 time. |
| 2 " 4 2 " | 4 " 8 2 " | 6 " 12 2 " |
| 2 " 6 3 " | 4 " 12 3 " | 6 " 18 3 " |
| 2 " 8 4 " | 4 " 16 4 " | 6 " 24 4 " |
| 2 " 10 5 " | 4 " 20 5 " | 6 " 30 5 " |
| 2 " 12 6 " | 4 " 24 6 " | 6 " 36 6 " |
| 2 " 14 7 " | 4 " 28 7 " | 6 " 42 7 " |
| 2 " 16 8 " | 4 " 32 8 " | 6 " 48 8 " |
| 2 " 18 9 " | 4 " 36 9 " | 6 " 54 9 " |
| 2 " 20 10 " | 4 " 40 10 " | 6 " 60 10 " |
| 2 " 22 11 " | 4 " 44 11 " | 6 " 66 11 " |
| 2 " 24 12 " | 4 " 48 12 " | 6 " 72 12 " |
| 3 in 3 1 time. | 5 in 5 1 time. | 7 in 7 1 time. |
| 3 " 6 2 " | 5 " 10 2 " | 7 " 14 2 " |
| 3 " 9 3 " | 5 " 15 3 " | 7 " 21 3 " |
| 3 " 12 4 " | 5 " 20 4 " | 7 " 28 4 " |
| 3 " 15 5 " | 5 " 25 5 " | 7 " 35 5 " |
| 3 " 18 6 " | 5 " 30 6 " | 7 " 42 6 " |
| 3 " 21 7 " | 5 " 35 7 " | 7 " 49 7 " |
| 3 " 24 8 " | 5 " 40 8 " | 7 " 56 8 " |
| 3 " 27 9 " | 5 " 45 9 " | 7 " 63 9 " |
| 3 " 30 10 " | 5 " 50 10 " | 7 " 70 10 " |
| 3 " 33 11 " | 5 " 55 11 " | 7 " 77 11 " |
| 3 " 36 12 " | 5 " 60 12 " | 7 " 84 12 " |

| | | |
|----------------|------------------|------------------|
| 8 in 8 1 time. | 9 " 81 9 " | 11 " 55 5 " |
| 8 " 16 2 " | 9 " 90 10 " | 11 " 66 6 " |
| 8 " 24 3 " | 9 " 99 11 " | 11 " 77 7 " |
| 8 " 32 4 " | 9 " 108 12 " | 11 " 88 8 " |
| 8 " 40 5 " | 10 in 10 1 time. | 11 " 99 9 " |
| 8 " 48 6 " | 10 " 20 2 " | 11 " 110 10 " |
| 8 " 56 7 " | 10 " 30 3 " | 11 " 121 11 " |
| 8 " 64 8 " | 10 " 40 4 " | 11 " 132 12 " |
| 8 " 72 9 " | 10 " 50 5 " | 12 in 12 1 time. |
| 8 " 80 10 " | 10 " 60 6 " | 12 " 24 2 " |
| 8 " 88 11 " | 10 " 70 7 " | 12 " 36 3 " |
| 8 " 96 12 " | 10 " 80 8 " | 12 " 48 4 " |
| 9 in 9 1 time. | 10 " 90 9 " | 12 " 60 5 " |
| 9 " 18 2 " | 10 " 100 10 " | 12 " 72 6 " |
| 9 " 27 3 " | 10 " 110 11 " | 12 " 84 7 " |
| 9 " 36 4 " | 10 " 120 12 " | 12 " 96 8 " |
| 9 " 45 5 " | 11 in 11 1 time. | 12 " 108 9 " |
| 9 " 54 6 " | 11 " 22 2 " | 12 " 120 10 " |
| 9 " 63 7 " | 11 " 33 3 " | 12 " 132 11 " |
| 9 " 72 8 " | 11 " 44 4 " | 12 " 144 12 " |

1. A shoemaker brought me 6 shoes; how many pairs were there?

2. The milk-man left at my house 6 pints of milk; how many quarts?

3. I saw in the tan-yard this morning 8 horns; how many cows had been killed?

4. I saw 8 table-legs lying in a cabinet-maker's shop; there were enough for how many tables?

5. I saw also 12 bed-posts; there were enough for how many bedsteads?

6. There are 3 chestnuts in one burr ; if I have 9, they are contained in how many burrs ?
7. How many burrs contain 12 chestnuts ?
8. How many burrs contain 15 chestnuts ?
9. The flower of a pink has 5 leaves ; 10 leaves, then, are obtained from how many flowers ?
10. If 4 scholars can sit at one desk, how many desks do I want for 8 scholars ?
11. How many desks do I want for 12 scholars ?
12. How many desks for 16 scholars ?
13. If one pod contains 5 peas, how many pods contain 15 peas ?

Table.

- | | |
|----------------------------|--------------------------|
| 6 and 1 quarter cents make | 1 fourpence-halfpenny. |
| 2 fourpence-halfpennies | " 1 ninepence. |
| 2 ninepences | " 1 quarter of a dollar. |
| 4 quarters | " 1 dollar. |
| 16 fourpence-halfpennies | " 1 dollar. |
| 8 ninepences | " 1 dollar. |
14. 6 fourpence-halfpennies make how many ninepences ?
 15. 12 fourpence-halfpennies make how many ninepences ?
 16. 8 ninepences make how many quarters of a dollar ?
 17. 16 ninepences make how many dollars ?
 18. 16 quarters make how many dollars ?
 19. 20 quarters make how many dollars ?
 20. 16 fourpence-halfpennies how many quarters ?

Dry Measure.

| | | | | |
|---------------|------|------------|------|-------|
| 2 pints (pt.) | make | 1 quart | sign | qt. |
| 8 quarts | " | 1 peck | " | pk. |
| 4 pecks | " | 1 bushel | " | bu. |
| 36 bushels | " | 1 chaldron | " | chal. |

21. In 16 pints how many quarts?
22. In 16 quarts how many pecks?
23. In 16 pecks how many bushels?
24. How many pecks in 24 quarts?
25. How many quarts in 20 pints?
26. How many bushels in 12 pecks?
27. It is 40 miles from Providence to Boston; how many hours will it take to travel from one place to the other, if I travel 4 miles an hour?
28. How many hours will it take a steam boat that goes 9 miles an hour, to go from Dover to Calais, 18 miles?
29. There are as many New England States as there are 3's in 18; how many are there?
30. There are as many Middle States as there are 3's in 15; how many are there?
31. There are as many Southern States as there are 3's in 21; how many are there?
32. The Romans chose 2 consuls each year; in how many years would they have 20 consuls?
33. Rome was built on as many hills as there are 2's in 14; on how many hills was it built?
34. Stockholm is built on as many islands as there are 3's in 21; on how many islands is it built?
35. I paid 8 dollars for wood, at 2 dollars per cord; how many cords did I purchase?
36. I paid 14 dollars for 2 barrels of flour; what did I give per barrel?
37. I have a tub that holds 10 gallons; if 2 gallons run out in one hour, in what time will it be emptied?
38. It is 28 miles from Springfield to Hartford;

if a man travel 4 miles an hour, how long will it take him to travel from one to the other?

39. If I ride 12 miles in 2 hours, how far do I ride in one hour?

40. If you cut 9 yards of cloth into 3 equal pieces, how many yards will there be in each piece?

41. If calico be 20 cents a yard, how much for a quarter of a yard?

Avoirdupois Weight.

| | | | | |
|------------|------|------------------|------|------|
| 16 drams | make | 1 ounce | sign | oz. |
| 16 ounces | " | 1 pound | " | lb. |
| 28 pounds | " | 1 quarter | " | qr. |
| 4 quarters | " | 1 hundred weight | " | cwt. |
| 20 hundred | " | 1 ton | " | T. |

42. In 8 quarters how many hundred weight?

43. In 12 quarters how many hundred weight?

44. 6 shillings in New England make 1 dollar; 12 shillings are how many dollars?

45. In 18 shillings how many dollars?

46. In New York they divide a dollar into 8 shillings; how many dollars in 16 shillings?

47. How many dollars in 24 shillings?

[*Notes.* A New England ninepence is a New York shilling; and a New England fourpence-halfpenny is a New York sixpence.]

48. How many 6-pences in a shilling?

49. How many 4-pences in a shilling?

50. How many 3-pences in a shilling?

51. How many 2-pences in a shilling?



SECTION II.

1. If a book has 40 pages, how many leaves has it? if 100, how many?

2. If a sheet of paper make 4 leaves, how many will make 40 leaves? 48? 80?

[A book having such leaves is called a *quarto*.]

3. If a sheet of paper make 8 leaves, how many will make 16? 32? 64?

[A book with such leaves is called *octavo*.]

4. If a sheet of paper make 12 leaves, how many will make 24? 36? 48?

[A book with such leaves is called *duodecimo*.]

5. If a sheet of paper make 18 leaves, how many will make 36?

[A book with such leaves is called *18mo*.]

6. If 4 quarters make one yard, how many yards in 12 quarters? in 16? in 20?

7. If 3 barley corns make one inch, how many inches in 6 barley corns? in 12? in 18? in 24? in 30?

8. If three feet make one yard, how many yards in 9 feet? in 21 feet? in 27? in 33?

9. The population of Boston is 60 thousand, and Portland 12; the population of Boston is how many times that of Portland?

10. The population of New Haven is 10 thousand; the population of Boston is how many times that of New Haven?

11. The population of Albany is 24 thousand, and Portland 12; the population of Albany is how many times greater than Portland?

12. The population of Trenton, N. J. is 4 thousand; how many times greater is the population of Albany? how many times greater is the population of Portland?

13. The city of Baltimore has 80 thousand in-

habitants, and New Haven 10; how many times greater is the population of Baltimore than New Haven?

14. An Olympiad was a term of 4 years; how many Olympiads in 20 years? 36? 80? 96?

15. Russia has a population of 42 millions, and the United States 13 millions; 42 is how many times 13?

16. Lake Michigan is 300 miles long, and Geneva 50; how many times longer is Michigan than Geneva?

17. Lake Superior is 360 miles long, and Nicaragua 120; how many times longer is Lake Superior than Nicaragua?

18. The Caspian Sea is 640 miles long, and Lake Wenner 80; how many times longer is the Caspian Sea?

19. Lake Erie is 240 miles long, and Lake Wenner 80; how much longer is Erie?

20. Charles I., who was beheaded in 1649, reigned 24 years, which was 4 times as long as Edward VI.; how long did Edward reign? (*App. A.*)

21. The Declaration of Independence was signed by 56 men, 1 seventh of whom were born in Massachusetts; how many were born in Massachusetts?

22. Henry VI. reigned 39 years, 3 times as long as George I.; how long was the reign of George I.? (*App. B, C.*)

23. Elizabeth reigned 45 years, which was 9 times as long as her sister, the bloody Mary, reigned; how long did Mary reign? (*App. D, E.*)

24. Henry III. reigned 56 years, which was 8 times as long as the reign of Oliver Cromwell;

how long, then, did Cromwell's reign continue ?

25. Henry III. reigned 14 times longer than James II. ; how long did James reign ? (*App. H.*)

26. Henry III. reigned 4 times longer than Henry IV. ; how long did Henry IV. reign ? (*App. I.*)

27. The reign of George III. was 60 years, which was 6 times as long as that of George IV. ; how long did George IV. reign ? (*App. K.*)

28. Charles II. reigned 24 years ; 6 times as long as James II. ; how long did James II. reign ?

29. 1 fourteenth of the signers of the Declaration of Independence were born in South Carolina ; how many were born there ?

30. 1 fourth of the signers died before the adoption of the Federal Constitution in 1788 ; how many died before that time ?



SECTION III.

1. Hampden Bank has a capital of 100 thousand dollars, and is divided into shares of 100 dollars each ; how many shares has it ?

2. The population of the United States has increased in 40 years, 9,000 thousand ; how much has it increased each year ?

3. It is calculated that 1 person dies out of 400 by intemperance every year ; how many die out of 4000 ?

4. If 1 die annually of intemperance out of 400, how many out of 40,000 ?

5. How many die out of 120 thousand ?

6. How many die out of 1200 thousand ?

7. How many die out of 12,000 thousand, or 12 millions ?

8. 30 thousand drunkards die annually in the United States; how many die in 6 months?

9. 15 thousand die in 6 months; how many die in one month?

10. 72 millions of gallons of spirits are drank annually in the United States; how much is drank in one month?

11. 12 millions of people drink 72 millions of gallons; how much does one person drink?

12. A man received 30 dollars for the use of 5 hundred; how much does he receive for the use of 1 hundred?

13. I receive 60 dollars for the use of 10 hundred; how much for the use of 1 hundred?

14. I receive 30 dollars for the use of 10 hundred; how much for the use of 1 hundred?

15. I receive 100 dollars for the use of 20 hundred; how much for the use of 1 hundred?

16. I receive 80 dollars for the use of 10 hundred; how much for the use of 1 hundred?

17. It is 3000 miles from Boston to Liverpool; and if a ship sails from one place to the other in 30 days, how many miles will it sail in one day?

18. The voyage is sometimes performed in 20 days; then the ship sails how far in a day?

19. It is 4000 miles from New York to Liberia; and if a ship sails 100 miles each day, how long will be the voyage?

20. How many days will it take a ship to sail to Liberia, if it sails 150 miles each day?

21. It is 5400 miles from New York to Rome; how far must a ship sail each day to reach there in 40 days?

22. It is 13,000 miles from Boston to Bombay:

if a ship sails 100 miles in a day, how many days will it take to go to Bombay ?

23. It is 13,000 miles from New York to the Sandwich Islands, round Cape Horn, and ships go there in about 130 days ; how far in a day ?

24. From New York to Cuba is 1250 miles ; how far must a ship sail in a day to go there in 10 days ?

25. It is 2000 miles from New York to New Orleans ; if a ship sails 100 miles each day, how long will be the voyage ?

26. There are in a year 8760 hours ; if I sleep 10 hours each day, how many days will it be before I shall have slept a year ?

27. There are 720 hours in a month, and if I sleep 8 hours a day, how long will it be before I shall have slept a month ?

28. If I sleep 6 hours a day, how long will it be before I shall have slept a month ?

29. It is 160 miles from New York to Albany ; and if a boat sails 10 miles an hour, how many hours will it take ?

30. It is 180 miles from New York to Providence ; how long will it take a steamboat to go from one place to the other, if it moves 12 miles an hour ?

31. It is 140 miles from Hartford to New York ; and if a steamboat is 20 hours going from one to the other, how many miles does it go in 1 hour ?

CHAPTER VI.

FRACTIONS.



SECTION I.

The word *Fraction* means something broken ; in Arithmetic it means a broken unit. Fractions are often written thus, $\frac{1}{4}$, which signifies *one fourth*, and means that the unit is divided into 4 parts. The figure below the line shows into how many parts 1 is divided, and is called the *denominator*. The figure above the line shows how many of the parts are to be used, and is called the *numerator*.

1. Write one third in figures ; write two thirds.
2. Write one fifth in figures ; write three fifths.
3. Write one eighth in figures ; write four eighths.
4. Write one ninth in figures ; write three ninths.
5. Write three twelfths in figures ; write two tenths.
6. How many halves has a dollar ?
7. How many halves have two pears ?
8. How many halves have four days ?
9. How many thirds has an hour ?
10. How many thirds of 1 hour have 3 hours ?
11. How many fourths has a month ?
12. How many fourths of 1 month have 4 months ?
13. How many fifths has a foot ?
14. How many fifths of 1 foot have 2 feet ?
15. How many sixths has a yard ?

16. How many sixths have 3 yards?
17. How many tenths have 4 weeks?
18. How many twelfths have 7 pounds?
19. How many twentieths have 2 inches?
20. How many eighteenthths have 2 minutes?
21. 3 feet make 1 yard; how many feet make 1 third of a yard? 2 thirds?
22. How many inches make 1 half of a foot?
23. How many inches make 1 third of a foot?
24. How many inches make 1 fourth of a foot?
25. How many pence make 1 third of a shilling?
26. How many pence make one sixth of a shilling?
27. How many barley-corns make 2 thirds of an inch?
28. How many quarters make 1 half of a yard?
29. How many quarters make 1 sixth of an ell French?
30. How many shillings make 1 third of a dollar?
31. John Urquhart died at the age of 18; what is one half of his age?
32. What is 1 third of 18? 1 sixth?
33. The Peak of Teneriffe is 12 thousand feet high; what is 1 fourth of the height? 1 third?
34. A stone falls 16 feet in 1 second; what is 1 eighth of it?
35. The weight of the air upon a square inch is 15 pounds; what is 1 fifth of it?
36. There are 6 mechanical powers; what is 1 sixth of the number?
37. There are 12 signs in the Ecliptic; what is 1 sixth of the number?

38. All the planets together have 18 moons ; what is $\frac{1}{9}$ of them ?

39. 12 make a dozen ; what is $\frac{1}{4}$ of a dozen ?

40. 24 sheets make 1 quire of paper ; what is $\frac{1}{8}$ of it ?

41. 20 quires of paper make 1 ream ; what is $\frac{1}{10}$ of a ream ?



SECTION II.

1. 4 quarts make one gallon ; 2 quarts are what part of a gallon ?

2. 1 inch is what part of a foot ? 2 inches ? 3 inches ? 4 inches ?

3. 1 foot is what part of a yard ? 2 feet ?

4. 1 cent is what part of a dollar ? 5 cents is what part ? 10 cents is what part ?

5. 1 shilling is what part of 6 shillings, or (in New England) a dollar ? 2 shillings is what part ? 3 shillings ? 4 shillings ? 5 shillings ?

6. If I sleep 8 hours every night, what part of 24 hours, or a day, do I sleep ?

7. If I sleep 6 hours every night, what part of 24 do I sleep ?

8. The river Amazon is 4 thousand miles long, and the Nile 2 thousand ; the Nile is what part in length of the Amazon ?

9. The Mississippi is 3 thousand miles long, and the Nile 2 thousand ; the Nile is what part of the Mississippi ?

10. The Mississippi is 30 hundred miles long, and the Euphrates 15 hundred ; the Euphrates is equal to what part of the Mississippi ?

11. The Nile is 20 hundred, and the Ohio 10 hundred miles long; the Ohio is what part in length of the Nile?

12. The Ohio is equal to what part of the Mississippi?

13. The Ohio is equal to what part of the Euphrates?

14. The Nile is equal to what part of the Mississippi?

15. The river Rhone in France is 5 hundred miles long; what part of the Ohio is it?

16. The Rhone is what part of the Nile?

17. The Rhone is what part of the Mississippi?

18. The river Gambia in Africa is 6 hundred miles long; the Gambia is what part of the Mississippi?

19. The Senegal is 9 hundred miles long; the Gambia is what part of it?

20. The Tornea is 3 hundred miles long; the Tornea is what part of the Gambia?

21. The Tornea is what part of the Senegal?

22. The Tornea is what part of the Mississippi?

23. The river Merrimack is 2 hundred miles long; the Merrimack is what part of the Tornea?

24. The Merrimack is what part of the Ohio?

25. The river Danube is 16 hundred miles long, and the Connecticut 4 hundred; the Connecticut is what part of the Danube?

26. The Merrimack is what part of the Danube?

27. The river Irawaddy is 12 hundred miles long; the Connecticut is what part of the Irawaddy?

28. The Gambia is what part of the Irawaddy?

29. The river Amazon is 40 hundred miles long ; the Ohio is what part of it ?



SECTION III.

1. The river Ganges is 16 hundred miles long ; what is $\frac{1}{4}$ of it ? $\frac{2}{4}$? $\frac{3}{4}$?

2. The Trojan war continued 10 years ; what is $\frac{1}{5}$ of it ? $\frac{2}{5}$? $\frac{3}{5}$? $\frac{4}{5}$?

• 3. Byron lived 36 years ; what is $\frac{1}{6}$ of it ? $\frac{2}{6}$? $\frac{3}{6}$? $\frac{4}{6}$? $\frac{5}{6}$?

4. The White Mountains are 7 thousand feet high ; what is $\frac{1}{7}$ of the height ? $\frac{3}{7}$? $\frac{4}{7}$? $\frac{6}{7}$?

5. At the battle of Cannæ 40 thousand Romans were slain ; what is $\frac{1}{8}$? $\frac{2}{8}$? $\frac{5}{8}$? $\frac{7}{8}$?

6. Sophocles, a Greek poet, wrote 120 tragedies ; what is $\frac{1}{10}$ of them ? $\frac{3}{10}$? $\frac{7}{10}$? (*Appendix, B.*)

7. Æschylus wrote 36 tragedies ; what is $\frac{1}{9}$ of them ? $\frac{3}{9}$? (*Appendix, A.*)

8. Alexander the Great was 33 years old when he died ; what is $\frac{1}{11}$ of his age ? $\frac{2}{11}$?

9. There are 12 signs in the Ecliptic ; $\frac{2}{3}$ of them are how many ?

10. Mahomet died at the age of 63 ; what is $\frac{4}{9}$ of it ?

11. $\frac{2}{3}$ of a cat's life is 10 years ; how long does a cat live ?

12. A cat's whole life is $\frac{3}{4}$ of a dog's ; how long does a dog live ?

13. The Jews were captives in Babylon 70 years; Cyrus reigned after their deliverance $\frac{1}{10}$ as long; how long did he reign?

14. Xerxes reigned $\frac{3}{10}$ as long as the Jews were in captivity; how long did he reign?

15. Saul reigned $\frac{4}{7}$ as long as the Jews were in Babylon; how long did he reign?

16. There were three Punic wars; the last one continued 3 years, which is $\frac{1}{16}$ of the whole; what was the duration of the whole?

17. When John Urquhart died, he was 19 years old; what is $\frac{2}{3}$ of his age?

18. 10 hundred British were killed at the battle of Bunker Hill, and $\frac{2}{5}$ as many Americans; how many Americans?

19. George IV. reigned 10 years, which was $\frac{2}{9}$ of the reign of Queen Elizabeth; how long was her reign?

20. Henry IV. reigned 14 years; $\frac{1}{2}$ of his reign equals $\frac{1}{3}$ of William the Conqueror's; how long was his? (*App. C.*)

21. Henry V. reigned 9 years; $\frac{1}{3}$ of his reign equals $\frac{1}{8}$ of the reign of Charles II.; how long did Charles reign? (*App. D, E.*)

22. George IV. reigned 10 years, which was $\frac{2}{7}$ of the reign of Edward I.; how long did Edward reign? (*App. F.*)

23. Charles I. reigned 24 years, which was $\frac{3}{7}$ of the reign of Henry III.; how long did Henry III. reign?

24. The Presidency of Washington was 8 years, which was $\frac{4}{5}$ of the reign of George IV.; how long was the reign of George IV.?

25. The Green Mountains are 4 thousand feet

high, which is 2 ninths of the height of Cotopaxi ; how high is Cotopaxi ?

26. The height of Cotopaxi is 6 sevenths of the height of Chimborazo ; how high is Chimborazo ?

27. The Peak of Teneriffe is 12 thousand feet high, which is 4 fifths of Mount Blanc ; how high is Mt. Blanc ?

28. The height of Teneriffe is 4 ninths of the height of Dawalageri ; how high is Dawalageri ?

29. Worcester has a population of 4 thousand, which is 2 eighths of the population of Providence ; what is the population of Providence ?

30. Springfield has a population of 6 thousand, which is 2 tenths of the population of Hampden County ; what is the population of Hampden Co. ?

31. Hampshire County has a population of 30 thousand, which is 5 sevenths of the population of Plymouth County ; what is the population of Plymouth County ?

CHAPTER VII.

COMPOUND FRACTIONS.



SECTION I.

[*Note.* By compound fractions is meant the fraction of a fraction, or a part of a part.]

1. What part of a whole shilling is 1 third of 1 fourth ?

[*Note.* If each fourth be divided into 3 parts, or thirds, the whole will be divided into twelfths.]

| | | | | | | | | | | |

2. What part of a whole foot is 1 third of 1 twelfth?

3. What part of a whole yard is 1 twelfth of 1 third?

4. What part of a whole dollar is 1 half of 1 tenth?

5. What part of a whole pound is 1 fourth of 1 fourth?

6. What part of a quart is 1 half of 1 fourth?

7. What part of a gallon is 1 half of 2 fourths?

8. What part of a bushel is 1 half of 1 eighth?

9. What part of a bushel is one half of 4 eighths?

10. What part of a dollar is 1 half of 1 sixth?

11. What part of a day is 1 fourth of 1 sixth?

12. What part of an hour is 1 third of 2 tenths?

13. What part of a year is 1 half of 1 sixth?

14. What part of a hogshead is 1 seventh of 1 ninth?

15. What part of a rood is 1 fourth of 2 tenths?

16. How many half shillings in a dollar?

17. How many half inches in a foot?

18. How many half pints in a gallon?

19. How many half pecks in a bushel?

20. How many half yards in a rod?

21. How many half dollars in an eagle?

22. Teneriffe is 12 thousand feet high; what is 1 third of 1 fourth of the height?

23. What is 1 half of 1 sixth of the height of Teneriffe?

24. What is 1 third of 1 half of the height of Teneriffe?

25. The highest peak of the Apennines is 8

thousand feet; what is $\frac{1}{4}$ of $\frac{1}{2}$ the height?

26. The highest mountain on Oahu, one of the Sandwich Islands, is 18 thousand feet; what is $\frac{1}{3}$ of $\frac{1}{3}$ of its height?

27. 15 thousand persons died of the cholera in Paris in 1832; what is $\frac{1}{3}$ of $\frac{1}{5}$ of the number?

28. In 1348, 50 thousand people died in London of the plague; what is $\frac{1}{2}$ of $\frac{1}{5}$ of the number?

29. In 1665, 8 thousand persons died of the plague in London in 1 week; what is $\frac{1}{2}$ of $\frac{1}{4}$ of the number?

30. In 1818, 30 thousand persons died at Gorakhpore in 1 month, of the cholera; what is $\frac{1}{3}$ of $\frac{1}{10}$ of the number?

31. In Shiraz, 16 thousand died of the same disease; what is $\frac{1}{4}$ of $\frac{1}{2}$ the number?

32. In Muscat, 60 thousand died of the same disease; what is $\frac{1}{2}$ of $\frac{1}{6}$ of the number?

33. On the island of Java, 100 thousand people died of the cholera; what is $\frac{1}{2}$ of $\frac{1}{10}$ of the number?

34. In the army of the Marquis of Hastings in India, 9 thousand died; what is $\frac{1}{2}$ of $\frac{1}{3}$ of the number?

SECTION II.

Addition of Fractions.

1. How much is 1 half added to 1 fourth?

[*Note.* Find how many of the smaller parts the larger will make, and then add the smaller part. As, in 1 half are 2 fourths; adding 1 fourth, gives 3 fourths for the answer. If there are more than 2 kinds, as 1 half, 1 fourth, and 1 eighth, see how many of the smallest each of the others will make, and add the whole together.]

2. Add 1 third to 1 ninth.
3. Add 1 third to 1 sixth.
4. Add 1 third to 1 twelfth.
5. Add 1 third to 1 fifteenth.
6. Add 1 third to 1 eighteenth.
7. Add 1 half to 1 eighth.
8. Add 1 half to 1 tenth.
9. Add 1 half to 1 twelfth.
10. Add 1 fourth to 1 eighth.
11. Add 1 fourth to 1 twelfth.
12. Add 1 fourth to 1 sixteenth.
13. Add 1 fifth to 1 tenth.
14. Add 1 sixth to 1 twelfth.
15. 1 fourth of the reign of David is 10 years; how much is 1 fourth and 1 half? (*App. A.*)
16. 1 eighth of the reign of Ahaz is 2 years; how much is 1 eighth and 1 fourth? (*App. B.*)
17. How much is 1 eighth, 1 fourth, and 1 half of the reign of Ahaz?
18. 1 ninth of Jehoshaphat's reign is 3 years; how much is 1 ninth and 1 third? (*App. C, D.*)
19. 1 sixth of the reign of Baasha is 4 years; what is 1 sixth and 1 third? (*App. D.*)
20. What is 1 sixth and 1 third and 1 twelfth of his reign?

21. $\frac{1}{9}$ of John Urquhart's life is $\frac{2}{3}$ years ; what is $\frac{1}{9}$ and $\frac{1}{3}$?
22. $\frac{1}{12}$ of the three Punic wars is 4 years ; what is $\frac{1}{12}$ and $\frac{1}{2}$?
23. $\frac{1}{8}$ of the whole life of Alexander the Great is 4 years ; what is $\frac{1}{8}$ and $\frac{1}{4}$?
24. $\frac{1}{6}$ of a shilling is 2 pence ; what is $\frac{1}{6}$ and $\frac{1}{3}$?
25. $\frac{1}{8}$ of a pound is 2 ounces ; what is $\frac{1}{8}$ and $\frac{1}{4}$?
26. $\frac{1}{9}$ of a yard is 4 inches ; what is $\frac{1}{9}$ and $\frac{1}{3}$?
27. $\frac{1}{12}$ of an hour is 5 minutes ; what is $\frac{1}{12}$ and $\frac{1}{6}$?
28. What is $\frac{1}{12}$, $\frac{1}{6}$ and $\frac{1}{3}$ of an hour ?
29. $\frac{1}{10}$ of an hour is 6 minutes ; what is $\frac{1}{10}$, $\frac{1}{5}$ and $\frac{1}{2}$?
30. $\frac{1}{15}$ of Dr. Watts's life is 5 years ; what is $\frac{1}{15}$ and $\frac{1}{3}$?



SECTION III.

1. Add $\frac{1}{2}$ to $\frac{1}{3}$.

[Note. Since the third cannot be reduced to halves, we must reduce both the half and the third to something else. We can reduce the third to sixths ; $\frac{1}{3}$ is $\frac{2}{6}$, and $\frac{1}{2}$ is $\frac{3}{6}$; therefore both equal $\frac{5}{6}$.]

2. Add $\frac{1}{3}$ and $\frac{1}{4}$.
3. Add $\frac{1}{3}$ and $\frac{1}{8}$.
4. Add $\frac{1}{4}$ and $\frac{1}{5}$.
5. Add $\frac{1}{4}$ and $\frac{1}{6}$.

6. Add 1 fifth and 1 sixth.
7. Add 1 fifth and 1 eighth.
8. Add 1 sixth and 1 eighth.
9. Add 1 sixth and 1 tenth.
10. 1 thirtieth of the life of Moses is 4 years; what is 1 sixth and 1 tenth? (*App. E.*)
11. 1 twenty-fourth of the time that David prophesied is 2 years; add 1 sixth and 1 eighth of it.
12. 1 twentieth of Saul's reign is 2 years; add 1 fifth and 1 eighth of it. (*App. F.*)
13. 1 fifth of Dr. Johnson's life is 15 years; add 1 fifth and 1 sixth of it together.
14. 1 twelfth of the duration of the Punic wars is 4 years; add 1 fourth and 1 sixth of it together.
15. 1 twentieth of the time the crusades continued is 10 years; add 1 fourth and 1 fifth of the whole time.
16. 1 twelfth of Lord Byron's life is 3 years; add 1 third and 1 eighth of his whole life.
17. 1 twelfth of the reign of Alexander the Great is 1 year; add 1 third and 1 fourth of his reign together.
18. 1 sixth of Sir William Jones's life is 8 years; add 1 half and 1 third of it.
19. Add 2 thirds and 1 twelfth.
20. Add 2 thirds and 1 sixth.
21. Add 3 fourths and 1 eighth.
22. Add 3 fourths and 1 sixth.
23. Add 3 eighths and 1 fourth.
24. Add 3 eighths and 1 sixth.
25. Add 5 eighths and 1 third.
26. Add 2 ninths and 1 sixth.
27. Add 3 tenths and 1 fifth.

ADDITION OF FRACTIONS.

28. Add 3 tenths and 1 half.
29. Add 4 twelfths and 1 third.
30. 1 twelfth of the length of Franklin's life is 7 years ; add 1 twelfth and 2 thirds of it.
31. 1 sixth of the height of Teneriffe is 1 thousand feet ; add 1 sixth and 2 thirds.
32. 1 eighth of the height of the Blue Ridge is 5 hundred feet ; add 1 eighth and 3 fourths.
33. 1 sixth of the height of Mount Olympus is 10 hundred feet ; add 1 sixth and 3 fourths.
34. 1 ninth of the height of Dawalageri is 3 thousand feet ; add 1 ninth and 2 thirds.
35. 1 fifth of the height of the great pyramid in Egypt is 1 hundred feet ; add 1 fifth and 3 tenths.
36. 1 tenth of the height of the temple at Jerusalem is 9 feet ; add 1 half and 3 tenths.
37. 1 tenth of the front of the temple is 15 feet ; add 2 tenths and 3 fifths.
38. 1 seventh of the height of the gate of the temple is 15 feet ; add 2 sevenths and 1 fifth.
39. 1 ninth of the circumference of the pillars that supported the gallery of the temple is 3 feet ; add 2 ninths and 2 thirds.

CHAPTER VIII.

DIVISION OF FRACTIONS.



SECTION I.

1. How many *fourths* of a yard in 4 yards?
2. How many in 4 and 1 fourth?
3. How many in 5 and 2 fourths?
4. How many *thirds* of an inch in 3 inches?
5. How many in 5 inches and 2 thirds?
6. How many *twelfths* of a foot in 3 feet?
7. How many in 4 feet and 3 twelfths?
8. How many tenths of a dollar in 1 dollar? in 1 dollar and 7 tenths?
9. How many sixths in 4 dollars and 5 sixths?
10. How many days in 1 week and 4 sevenths of a week?
11. How many shillings in 2 dollars and 4 sixths of a dollar?
12. How many farthings in 2 pennies and 2 fourths?
13. How many feet in 2 yards and 2 thirds?
14. How many quarts in 3 gallons and 3 fourths?
15. How many ounces in 2 pounds and 4 sixteenths?
16. How many ounces in 3 pounds and 8 sixteenths?
17. How many barley-corns in 3 inches and 2 thirds?
18. How many eggs make 1 dozen and 1 half?

19. There are 24 sheets in a quire of paper ; how many sheets in 1 quire and 1 half?

20. How many furlongs in 1 mile and 2 eighths?

21. How many furlongs in 1 mile and 1 half?

22. How many furlongs in 2 miles and 1 fourth?

23. How many yards in 2 rods?

24. How many yards in 3 rods?

25. How many 9-pences in 1 dollar and 1 half?

26. How many 9-pences in 1 dollar and 1 quarter?

27. How many 3-pences in 1 shilling and 1 half?

28. In 8 shillings and 1 sixth, how many pence?

29. In 4 dollars and 1 third, how many shillings?

30. In 5 yards and 1 half, how many quarters?

31. In 2 ells English and 2 fifths, how many quarters?

32. In 3 ells Flemish and 2 thirds, how many quarters?

33. In 4 ells French and 1 half, how many quarters?

34. 2 inches and 1 fourth make 1 nail ; how many fourths of an inch in 2 nails?

35. Solomon made 2 cherubim for the temple, each 10 cubits high ; (a cubit is 1 foot and 1 half) how many feet high were the cherubim?

36. The wings of the cherubim were each 5 cubits ; how many feet?

37. The molten sea in the temple at Jerusalem was 10 cubits from one brim to the other ; how many feet?

38. It was 5 cubits high; how many feet?
 39. The waters of the deluge rose 15 cubits above the highest hills; how many feet?
 40. 20 quires of paper make 1 ream; how many quires in 1 ream and 2 fifths?



SECTION II.

1. 1 half is how many fourths?
2. 1 third is how many sixths?
3. A spider has 6 eyes; what is 1 third of them? 1 sixth? How many sixths in 1 third?
4. Byron lived 36 years; what is 1 twelfth of his life? 1 sixth? How many twelfths make 1 sixth?
5. The Revolutionary war continued 8 years; what is 1 half of it? 1 fourth? How many fourths make 1 half?
6. John Urquhart lived 18 years; what is 1 third of his life? 1 ninth? How many ninths make 1 third?
7. Xerxes the Great reigned 21 years; what is 1 third of his reign? 1 seventh? How many thirds make 1 seventh?
8. Cincinnati has a population of 24 thousand; what is 1 fourth? 1 eighth? How many eighths make 1 fourth?
9. Albany has a population of 24 thousand; what is 1 fourth of it? 1 twelfth? how many twelfths make 1 fourth?
10. New Haven has a population of 10 thousand; what is 1 half of it? 1 tenth? How many tenths make 1 half?

11. A cat lives 15 years ; what is $\frac{2}{3}$ of it ?

12. George IV. reigned 10 years ; what is $\frac{2}{5}$ of it ? $\frac{3}{5}$? How many fifths make 1 half ?

13. Alfred the Great reigned 28 years ; what is $\frac{1}{7}$? $\frac{3}{7}$? how many sevenths equal $\frac{1}{2}$ of his reign ? (*App. A.*)

14. George III. reigned 60 years ; what is $\frac{1}{5}$ of his reign ? $\frac{2}{5}$? $\frac{4}{10}$?

15. Mont Blanc is 15 thousand feet high ; what is $\frac{1}{5}$ of it ? $\frac{2}{3}$?

16. Doonfield Mountains are 8 thousand feet high ; what is $\frac{3}{4}$ of the height ?

17. Cotopaxi is 18 thousand feet high ; what is $\frac{4}{9}$ of the height ?

18. Mount Olympus is 6 thousand feet high ; what is $\frac{1}{3}$ of $\frac{1}{2}$ the height ?

19. $\frac{1}{3}$ of $\frac{1}{2}$ is what part of the whole ?

20. The Snow Mountains of Africa are 10 thousand feet high ; what is $\frac{1}{5}$ of $\frac{1}{2}$ the height ?

21. Lake Wenner is 80 miles long ; what is $\frac{1}{2}$ of $\frac{1}{10}$ of it ?

22. How much is $\frac{1}{4}$ of $\frac{1}{2}$ dollar ?

23. What is $\frac{1}{4}$ of $\frac{1}{4}$ of a yard ?

24. What is $\frac{1}{2}$ of $\frac{6}{12}$ of a foot ?

25. What is $\frac{1}{3}$ of $\frac{1}{2}$ yard ?

26. What is $\frac{2}{3}$ of a half dollar ?

27. Jupiter revolves about the sun in 12 years ; what is $\frac{1}{2}$ of $\frac{1}{3}$ of the time ?

28. Saturn revolves in 30 years ; what is $\frac{1}{2}$ of $\frac{1}{5}$ of the time ?

29. Herschel revolves in 84 years; what is 1 half of 1 seventh of the time?

30. A stone falls 16 feet in one second; what is 1 fourth of 1 fourth of it?

31. The Earth has a diameter of 8 thousand miles; what is 1 third of 3 fourths of it?



SECTION III.

Compound Fractions, and Simple Multiplication.

1. 2 thirds of 1 sixth of John Urquhart's age is 2 years; what is the whole age?

2. 1 half of 1 seventh of the duration of the Peloponnesian war is 2 years; how long did it continue?

3. 1 half of 1 fourth of the American Revolution is 1 year; how long did it continue?

4. 1 half of 1 sixth of the duration of the three Punic wars is 4 years; how long did the Punic wars continue?

5. 1 third of 1 half of the reign of Alexander the Great is 2 years; how long did he reign?

6. 1 half of 1 fourth of the life of Alexander the Great is 4 years; how long did he live?

7. 1 fourth of 1 sixth of the age of Moses is 5 years; how old was Moses when he died?

8. 1 half of 1 fifth of the age of Joshua is 11 years; at what age did he die? (*App. B.*)

9. 1 fourth of 1 fourth of the whole length of the Jordan is 10 miles; how long is the Jordan?

10. 1 third of 1 fifth of the width of the Jordan is 2 yards; how wide is the river?

11. $\frac{1}{3}$ of $\frac{1}{5}$ of the length of the Dead Sea is 5 miles; what is the whole length?

12. $\frac{1}{3}$ of $\frac{1}{6}$ of a cubit is 1 inch; how long is a cubit?

13. $\frac{2}{6}$ of $\frac{1}{10}$ of all the people that perished in the earthquake at Antioch is 2 thousand; how many perished?

14. $\frac{1}{4}$ of $\frac{2}{6}$ of the number of courses into which the Jewish priests were divided is 2; what is the whole number?

15. $\frac{1}{2}$ of $\frac{1}{6}$ of the number of tribes into which the Jews were divided is 1; what is the number?

16. $\frac{2}{5}$ of $\frac{1}{8}$ of the number of years that Micah prophesied is 2 years; how long did he prophesy?

17. $\frac{1}{3}$ of $\frac{1}{9}$ of the number of years that Samuel prophesied is 3; how long did Samuel prophesy? (*App. C.*)

18. $\frac{1}{4}$ of $\frac{1}{12}$ of the time that David prophesied is 1 year; how long did he prophesy?

19. $\frac{1}{10}$ of $\frac{1}{9}$ of Isaac's life is 2 years; how long did he live? (*App. D.*)

20. $\frac{1}{5}$ of $\frac{1}{7}$ of Abraham's life is 5 years; how long did he live? (*App. E.*)

21. $\frac{1}{10}$ of $\frac{1}{10}$ of the number who died in Montreal by cholera is 10; what was the whole number?

22. $\frac{1}{3}$ of $\frac{1}{8}$ of the number who died in Edinburgh, of cholera, is 3; what was the whole number?

23. $\frac{1}{10}$ of $\frac{1}{10}$ of the number of deaths

by cholera in Stettin is 5; what was the whole number?

24. When the tide from the ocean meets the current of the river Amazon, it raises a mountain of water; $\frac{1}{9}$ of $\frac{1}{10}$ of its height is 2 feet; what is its height?

25. $\frac{1}{3}$ of $\frac{1}{10}$ of the length of the Alleghany Mountains is 30 miles; what is the whole length?

26. $\frac{1}{10}$ of $\frac{1}{7}$ of the length of the Green Mountains is 5 miles; what is the whole length?

27. $\frac{1}{5}$ of $\frac{1}{14}$ of the length of the Apennines is 10 miles; what is the whole length?

28. $\frac{1}{5}$ of $\frac{1}{8}$ of the length of the Pyrenees is 5 miles; what is the whole length?

29. $\frac{1}{10}$ of $\frac{1}{3}$ of the distance to which Mount Hecla throws its lava is 5 miles; what is the distance?

30. $\frac{1}{3}$ of $\frac{1}{5}$ of the length of the Dismal Swamp in North Carolina is 2 miles; what is the whole length?

31. $\frac{1}{2}$ of $\frac{1}{4}$ of the weight of a peach in Chili is 2 ounces; what is the whole weight?

32. $\frac{1}{5}$ of $\frac{1}{6}$ of the length of Loch Lomond, the largest lake in Scotland, is 1 mile; what is the length?

CHAPTER IX.

FRACTIONS—(continued.)



SECTION I.

1. The Trojan war continued 10 years ; what is $\frac{2}{3}$ of it ?
2. The Revolutionary war continued 8 years ; what is $\frac{2}{3}$ of it ?
3. A Greek Olympiad was 4 years ; what is $\frac{2}{6}$ of it ?
4. Washington was president 8 years ; what is $\frac{3}{5}$ of it ?
5. The Peloponnesian war continued 28 years ; what is $\frac{3}{6}$ of it ?
6. The reign of Alexander was 12 years ; what is $\frac{3}{8}$ of it ?
7. 3 miles make a league ; what is $\frac{2}{6}$ of it ?
8. 12 inches make a foot ; what is $\frac{2}{7}$ of it ?
9. Goliath was 11 feet high ; what is $\frac{2}{5}$ of his height ? (*Appendix, A.*)
10. Goliath's helmet weighed 15 pounds ; what is $\frac{3}{9}$ of it ?
11. Goliath's spear was 26 feet long ; what is $\frac{4}{10}$ of it ?
12. The head of Goliath's spear weighed 38 pounds ; what is $\frac{3}{9}$ of it ?
13. Philip's war lasted 3 years ; what is $\frac{5}{7}$ of it ? (*App. B.*)

14. 6 hundred white men were killed in Philip's war; what is $\frac{3}{4}$ of the number?

15. Elias Cornelius died aged 38; what is $\frac{4}{11}$ of his age? (*App. C.*)

16. Jeremiah Evarts died aged 50; what is $\frac{4}{12}$ of his age? (*App. D.*)

17. Levi Parsons died aged 30; what is $\frac{5}{7}$ of his age? (*App. E.*)

18. Pliny Fisk died aged 33; what is $\frac{5}{6}$ of his age? (*App. F.*)

19. Lafayette was 19 years old when the United States declared Independence; what was $\frac{3}{7}$ of his age?

20. Dr. Herschel died aged 84; what is $\frac{7}{12}$ of his age? (*App. G.*)

21. North Carolina has 62 counties; what is $\frac{2}{12}$ of the number?

22. South Carolina has 28 counties; what is $\frac{4}{9}$ of the number?

23. There is a stream of water in Nicojack cave, Georgia, 60 feet wide; what is $\frac{3}{13}$ of the number?

24. Natchez is situated on a bluff 50 yards above the water of the Mississippi; what is $\frac{3}{11}$ of the number?

25. At Surat is a hospital for sick animals, in which there is a tortoise that has been there 75 years; what is $\frac{3}{8}$ of the number?

26. William IV. king of England, is now (1832) 67 years old; what is $\frac{3}{9}$ of his age?

27. Louis Philip, king of France, is now* 60 years old; what is $\frac{3}{8}$ of his age?

* By now, understand 1832.

28. Frederic William III., king of Prussia, is now 62 years old ; what is $\frac{4}{6}$ of his age ?

29. Anthony, king of Saxony, is now 76 years old ; what is $\frac{2}{9}$ of his age ?

30. William, king of Wurtemberg, is now 51 years old ; what is $\frac{2}{10}$ of his age ?

31. Louis, king of Bavaria, is now 46 years old ; what is $\frac{5}{9}$ of his age ?

32. Francis, emperor of Austria, is now 64 years old ; what is $\frac{4}{9}$ of his age ?

33. Ferdinand VII., king of Spain, is now 48 years old ; what is $\frac{3}{7}$ of his age ?

34. Miguel, king of Portugal, is now 30 years old ; what is $\frac{2}{13}$ of his age ?

35. Charles Amadeus, king of Sardinia, is now 32 years old ; what is $\frac{2}{11}$ of his age ?

36. Ferdinand II., king of the two Sicilies, is now 22 years old ; what is $\frac{2}{15}$ of his age ?

37. Mahmoud II., Grand Seignior of Turkey, is now 47 years old ; what is $\frac{2}{5}$ of his age ?

38. Gustavus IV., king of Sweden and Norway, is now 54 years old ; what is $\frac{3}{10}$ of his age ?

39. Nicholas, emperor of Russia, is 36 years old ; what is $\frac{3}{7}$ of his age ?

40. Frederic VI., king of Denmark, is now 64 years old ; what is $\frac{7}{8}$ of his age ?



SECTION II.

1. What is $\frac{3}{4}$ of the interest of 100 dollars for two years at 6 per cent. ?

2. What is $\frac{1}{5}$ of the interest of 20 dollars for 1 year, at 6 per cent. ?

3. What is 2 sixths of the interest of 15 dollars for 3 years, at 6 per cent. ?

4. What is 2 thirds of the interest of 18 dollars for 1 year and 1 half, at 6 per cent. ?

5. What is 4 tenths of the interest of 10 dollars for 2 years, at 5 per cent. ?

6. What is 3 fourths of the age of Prof. Fisher, who died aged 3 times 9 and 1 third ? (*App. H.*)

7. What is 2 thirds of Prof. Allen's age, who was killed, aged 7 times 4 and 1 seventh ? (*App. I.*)

8. What is 5 eighths of Gen. Shepard's age, who died aged 9 times 8 and 8 ninths ? (*App. K.*)

9. What is 2 thirds of President Willard's age, who died aged 7 times nine and 3 sevenths ? (*App. L.*)

10. What is 3 thirteenths of President Dwight's age, who died aged 9 times 7 and 2 ninths ? (*App. M.*)

11. What is 2 ninths of Prof. Marsh's age, who died 4 times 6 and 3 fourths ? (*App. N.*)

12. What is 1 half of Dr. Scott's age, who died aged 9 times 8 and 2 ninths ? (*App. O.*)

13. What is 1 third of President Moore's age, who died aged 5 times 10 and 3 fifths ? (*App. P.*)

14. What is 4 ninths of the height of Cotopaxi, which is 4 times 4 and 1 half thousand feet high ?

15. What is 3 fifths of the height of the Snow Mountains, which are 3 times 3 and 1 third thousand feet high ?

16. What is 1 half of the height of Mt. Etna,

which is 2 times 5 and 1 half thousand feet high ?

17. What is 2 thirds of the height of Mt. Atlas, which is 4 times 3 and 1 fourth thousand feet ?

18. What is 2 thirds of the length of the Chinese Wall, which is 4 times 3 and 3 fourths hundred feet long ?

19. What is 2 fifths of the length of the Middlesex canal, which is 3 times 8 and 1 third miles long ?

20. What is 6 tenths of the fall called Cohoes, on the Mohawk, the whole being 9 times 7 and 7 ninths ?

21. What is 1 third of the distance from Albany to Saratoga, the whole being 9 times 3 and 3 ninths miles ?

22. What is 4 elevenths of the distance that the Delaware is navigable, the whole being 6 times 9 and 1 sixth miles ?

23. What is 4 fifths of the distance of Hartford from the mouth of the Connecticut River, the whole being 7 times 7 and 1 seventh miles ?

24. What is 3 sevenths the distance the Thames, in Connecticut, is navigable, the whole being 3 times 4 and 2 thirds miles ?

25. What is 4 twelfths the distance of the city of London from the mouth of the Thames, the whole being 9 times 6 and 6 ninths miles ?

26. What is 5 twentieths of the distance from Montreal to Quebec, the whole being 7 times 25 and 5 sevenths miles ?

27. What is 2 thirds of the number that died of the cholera in Paris ; the whole being 4 times 3 and 3 fourths hundreds ?

28. What is 1 half the number that died of the cholera in Montreal, in one day, when the whole was 8 times 14 ?

29. What is 3 fourths of the time the city of London continued to burn, when the whole time was 4 sevenths of a week ?

30. What is 4 ninths of the width of the Strait of Dover, the whole being 4 and 1 half times 4 ?



SECTION III.

[*Notes.* $\frac{1}{4}$ signifies 1 fourth ; $\frac{3}{8}$, 3 thirds.]

1. If $\frac{1}{2}$ and $\frac{1}{4}$ and 7 be added, the whole will be the length of the Peloponnesian war ; what was it ?

2. If $\frac{3}{10}$ and $\frac{3}{5}$ and 5 be added, the whole will be the length of Sir H. Davy's life ; what was his life ? (*App. Q.*)

3. If $\frac{3}{4}$ and $\frac{2}{3}$ and 9 be added, the whole will be the length of the Blackstone canal ; how long is it ?

4. If $\frac{1}{4}$ and $\frac{3}{4}$ and 4 be added, the whole will be the length of the Delaware and Chesapeake canal ; how long is it ?

5. If $\frac{3}{8}$ and $\frac{1}{4}$ and 12 be added, the whole will be the width of the Morris canal ; how wide is it ?

6. If $\frac{3}{12}$ and $\frac{2}{3}$ and 15 be added, the whole will be the width of the Union canal ; how wide is it ?

7. If $\frac{3}{4}$ and $\frac{2}{4}$ and 2 be added, the whole will equal the number of letters introduced into Greece by Cadmus ; how many were there ?

8. If $\frac{1}{4}$ and $\frac{3}{4}$ and 5 be added, the whole will equal the reign of Xerxes ; how long did he reign ?

9. If $\frac{1}{4}$ and $\frac{1}{4}$ and 5 be added, the whole will equal the height to which the pressure of the atmosphere will raise mercury ; how high will it rise ?

10. If $\frac{2}{12}$ and $\frac{4}{6}$ and 12 be added, the whole will be the length of Roger Sherman's life ; how long did he live ? (*App. R.*)

[*Note.* Understand the questions in this Section thus : If $\frac{2}{12}$ of Roger Sherman's age be added to $\frac{4}{6}$ of his age, 12 will complete his age.]

11. If $\frac{2}{12}$ and $\frac{4}{6}$ of his age and 10 be added, the whole will be the age of Eli Whitney ; what was it ? (*App. S.*)

12. If $\frac{1}{3}$ and $\frac{1}{2}$ and 13 be added, the whole will be the age of Sir William Caxton ; what was his age ? (*App. T.*)

13. If $\frac{1}{4}$ and $\frac{1}{4}$ and 2 be added, the whole will be the specific gravity of platina ; what is it ?

14. If $\frac{1}{3}$ and $\frac{3}{8}$ and $\frac{4}{4}$ and 3 be added, the whole will be the age of Mahomet ; what was his age ?

15. If $\frac{1}{2}$ and $\frac{1}{2}$ and $\frac{1}{6}$ and 4 be added, the whole will be the number of years it takes Saturn to revolve about the Sun ; how long ?

16. If $\frac{2}{3}$ and $\frac{2}{3}$ and 1 hundred be added, the whole will be the length of the Alleghany Mountains ; how long are they ?

17. If $\frac{2}{24}$ and $\frac{2}{12}$ and $\frac{3}{8}$ and $\frac{3}{8}$ and 9 be added, the whole will be the height of the falls of the Passaic ; how high is the fall ?

18. If $\frac{2}{8}$ and $\frac{2}{6}$ and $\frac{4}{6}$ and 5 be added, the whole will be the distance of New Orleans from the Gulf of Mexico ; how far is it ?

19. If $\frac{2}{4}$ and $\frac{1}{4}$ and 4 be added, the whole will be the pressure of air upon a square inch ; what is it ?

20. If $\frac{3}{2}$ of a pole be in the ground, and $\frac{3}{4}$ in water, and 4 feet in the air, how long is the pole?

21. If $\frac{3}{8}$ and $\frac{1}{4}$ and $\frac{5}{16}$ and 2 be added, the sum will be the length of the Liverpool and Manchester rail-road; what is its length?

22. If $\frac{1}{8}$ and $\frac{1}{3}$ and $\frac{1}{4}$ and 3 be added, the sum will equal the number of inches the snow fell in New York on the 9th of May, 1830; what was the depth?

23. If $\frac{3}{8}$ and $\frac{1}{8}$ and $\frac{1}{10}$ and 10 be added, the sum will equal the circumference of one of the cedars of Lebanon; what is the circumference?

24. If $\frac{1}{8}$ and $\frac{1}{4}$ and $\frac{1}{2}$ and 4 be added, the sum will be the number of senators in the New York legislature; what is the number?

25. If $\frac{1}{3}$ and $\frac{1}{4}$ and $\frac{1}{6}$ and 3 be added, the sum will equal the number of governors New York has had since it became an independent state; what is the number?

26. If $\frac{1}{2}$ and $\frac{3}{8}$ and 4 be added, the sum will equal the number of the Massachusetts senate; what is the number?

27. If $\frac{3}{8}$ and $\frac{3}{8}$ and 10 be added, the sum will equal the number of inhabitants to a square mile in New York; what is the number?

28. If $\frac{3}{8}$ and $\frac{5}{12}$ and 13 be added, the sum will be the number of inhabitants to a square mile in Massachusetts; what is the number?

29. If $\frac{1}{3}$ and $\frac{1}{4}$ and $\frac{1}{6}$ and $\frac{1}{12}$ and 10 be added, the sum will be the number of inhabitants to a square mile in Rhode Island; what is the number?

30. If $\frac{3}{8}$ and $\frac{1}{2}$ and $\frac{1}{4}$ and 2 be added, the sum will equal the number of inhabitants to a square mile in Maine; what is the number?

CHAPTER X.

FRACTIONS—(continued.)



SECTION I.

1. The height of the White Mountains is 3 times 2 and 1 third thousand feet; what is the height?

2. The height of Mt. Atlas is 4 times 3 and 1 fourth thousand feet; what is the height?

3. The height of Chimborazo is 6 times 3 and 1 half thousand feet; how high is it?

4. The salary of the President of the United States is 3 times 8 and 1 third thousands of dollars; what is his salary?

5. The salary of the Chief Justice of the United States is 8 times $\frac{3}{4}$ of a thousand dollars; what is his salary?

6. The salary of the Post Master General is 9 times $\frac{3}{4}$ of a thousand dollars; what is his salary?

7. The whole number of soldiers in the American army during the Revolution was 10 times 28 and $\frac{8}{10}$ thousands; what was the number?

[Note. 28 and $\frac{8}{10}$ is the same as $28\frac{8}{10}$.]

8. The distance of Jerusalem east of the Mediterranean is 4 times $10\frac{1}{4}$ miles; what is the distance?

9. The age of Mrs. Harriet Newell at her death was 4 times $4\frac{1}{2}$ years; how old was she?

10. Cæsar landed in Britain 6 times $9\frac{1}{4}$ years before Christ; in what year? (*App. A.*)

11. Cleopatra died before Christ 4 times $7\frac{1}{2}$ years; in what year? (*App. B.*)

12. The first Julian year began 6 times $7\frac{3}{4}$ years before Christ; in what year?

13. The battle of Pharsalia was before Christ 5 times $9\frac{3}{4}$ years; in what year?

14. Sylla died before Christ 9 times $8\frac{5}{8}$ years; in what year? (*App. C.*)

15. Crassus was killed before Christ 10 times $5\frac{3}{10}$ years; in what year? (*App. D.*)

16. Nero was made emperor in the year of our Lord 7 times $7\frac{1}{4}$; in what year? (*App. E.*)

17. Nero set Rome on fire in the year of our Lord 6 times $10\frac{1}{4}$; in what year?

18. There was a dreadful plague at Rome, in the year 9 times $8\frac{5}{8}$; ten thousand died in a day; in what year?

19. Josephus died in the year of our Lord 10 times $9\frac{3}{10}$; in what year? (*App. F.*)

20. Tacitus died in the year of our Lord 8 times $12\frac{3}{4}$; in what year? (*App. G.*)

21. The motion of the earth in its orbit is 9 times $7\frac{1}{2}$ thousand miles, in an hour; how fast does the earth move?

22. The distance from Lake Merom to the Sea of Galilee is 3 times $9\frac{1}{4}$ miles; what is the distance?

23. The number of bones in one hand is 6 times $4\frac{1}{2}$; what is the number?

24. Judas betrayed Christ for 4 times $7\frac{1}{2}$ pieces of silver; how many pieces did he receive?

25. Shechem, where Joseph was buried, is north of Jerusalem 4 times $8\frac{3}{4}$ miles; how many miles?

26. A Roman penny, the price of a day's work anciently, was 2 times $6\frac{1}{2}$ cents ; how many cents did they receive ?



SECTION II.

1. 13 towns were destroyed in Philip's war ; what is $\frac{3}{4}$ of the number ?

2. In the Pequot war, Capt. Mason burnt 70 Indian wigwams ; what is $\frac{3}{11}$ of the number ?

3. The Indians killed 47 people in Deerfield in one night ; what is $\frac{2}{5}$ of the number ?

4. On the same night the Indians carried away 100 captives ; what is $\frac{3}{11}$ of the number ?

5. The Erie canal cost 8 million dollars ; what is $\frac{2}{3}$ of it ?

6. The Erie canal is 40 feet wide ; what is $\frac{3}{4}$ of it ?

7. The Baltimore rail-road cars run 12 miles an hour ; what is $\frac{1}{4}$ of it ?

8. The settlement of Jamestown was begun by 105 persons ; what is $\frac{1}{2}$ of them ?

9. The settlement at Plymouth was begun by 101 persons ; what is $\frac{1}{11}$ of the number ?

10. 100 British soldiers were killed in the battle at Princeton ; what is $\frac{1}{5}$ of the number ?

11. The British destroyed at Concord 60 barrels of flour ; what is $\frac{1}{3}$ of it ?

12. When the Indians burnt Schenectady, they killed 60 persons ; what is $\frac{3}{4}$ of the number ?

13. When Schenectady was burnt, the Indians took 25 prisoners ; what is $\frac{1}{5}$ of the number ?

14. The tide rises at New York 5 feet ; what is $\frac{1}{4}$ of it ?

15. At Newburyport, the tide rises 10 feet; what is $\frac{1}{4}$ of the number?

16. At Eastport, Maine, the tide rises 25 feet; what is $\frac{2}{3}$ of the number?

17. At St. John's, the tide rises 30 feet; what is $\frac{1}{2}$ of the number?

18. A right angle contains 90° ; what is $\frac{1}{12}$ of it?

19. The Americans threw 340 chests of tea into Boston harbor; what is $\frac{5}{8}$ of the number?

20. The tea was thrown into the ocean by 17 men dressed as Indians; what is $\frac{1}{3}$ of the number?

21. 13 States were at first admitted to the Union; what is $\frac{2}{3}$ of the number?

22. All that part of the United States west of the Mississippi was purchased of the French for 15 million dollars; what is $\frac{1}{5}$ of it?

23. There are on the Erie canal 83 locks; what is $\frac{2}{3}$ of the number?

24. Columbus was 44 years old when he discovered America; what is $\frac{2}{3}$ of it?

25. Columbus died aged 70 years; what is $\frac{1}{2}$ of his age? (*App. H.*)



SECTION III.

1. 22 is $\frac{1}{4}$ of the age of Pliny Fisk; what was his age?

2. 25 is $\frac{1}{12}$ of the age of Wickliff; what was his age?

3. 15 is $\frac{3}{11}$ of the age of Dr. Dwight; what was his age?

4. 20 is $\frac{4}{10}$ of the age of Jeremiah Evarts; what was his age?

5. 27 is $\frac{3}{8}$ of the age of Aristotle; what was his age?

6. $10\frac{1}{2}$ is $\frac{2}{3}$ of the age of Charles XII.; what was his age?

7. $14\frac{3}{4}$ is $\frac{3}{4}$ of the age of Constantine; what was his age?

8. $23\frac{1}{2}$ is $\frac{3}{8}$ of the age of Cicero; what was his age?

9. 15 is $\frac{2}{15}$ of the age of Dr. Watts; what was his age?

10. $6\frac{3}{4}$ is $\frac{2}{3}$ of the age of Prof. Fisher; what was his age?

11. $12\frac{3}{4}$ is $\frac{2}{7}$ of the age of Prof. Allen; what was his age?

12. $11\frac{1}{4}$ is $\frac{3}{8}$ of the age of Levi Parsons; what was his age?

13. $15\frac{1}{2}$ is $\frac{2}{7}$ of the age of President Moore; what was his age?

14. $9\frac{1}{2}$ is $\frac{3}{8}$ of the age of Pollok; what was his age?

15. $14\frac{6}{11}$ is $\frac{2}{11}$ of the age of Plato; how old was Plato?

16. 12 is $\frac{3}{15}$ of the age of Robert Raikes; what was his age?

17. $8\frac{1}{2}$ is $\frac{2}{3}$ of the age of Elias Cornelius; what was his age?

18. 22 is $\frac{2}{7}$ of Dean Swift's age; what was his age?

19. $19\frac{1}{2}$ is $\frac{2}{3}$ of John Eliot's age; how old was Eliot?

20. $14\frac{3}{4}$ is $\frac{2}{3}$ of the age of Dr. Doddridge; what was his age?

21. 4 miles is $\frac{7}{80}$ of the distance a horse ran in one hour in 1721; how far in an hour?

22. $14\frac{1}{2}$ degrees is $\frac{2}{3}$ of the annual average temperature of New England; what is it?

23. $26\frac{1}{2}$ miles is $\frac{2}{3}$ of the distance at which the Peak of Teneriffe can be seen; how far can it be seen?

24. $18\frac{1}{2}$ is $\frac{2}{3}$ of the population to a square mile in Massachusetts; what is the whole number to a mile?

25. 14 is $\frac{2}{3}$ of the population to a square mile in New York; what is the whole number to a square mile?

CHAPTER XI.

FRACTIONS—(continued.)

SECTION I.

1. If $\frac{1}{2}$ be subtracted from $\frac{1}{2}$, what will remain?
2. Subtract $\frac{1}{8}$ from $\frac{1}{4}$.
3. Subtract $\frac{1}{6}$ from $\frac{1}{3}$.
4. Subtract $\frac{1}{12}$ from $\frac{1}{4}$.
5. Subtract $\frac{1}{15}$ from $\frac{1}{5}$.
6. Subtract $\frac{2}{8}$ from $\frac{2}{3}$.
7. Subtract $\frac{5}{8}$ from $\frac{3}{4}$.
8. Subtract $\frac{2}{3}$ from $\frac{1}{2}$.
9. Subtract $\frac{1}{3}$ from $\frac{5}{8}$.
10. Subtract $\frac{2}{10}$ from $\frac{6}{10}$.
11. The difference between $\frac{1}{2}$ and $\frac{1}{3}$ of a certain poet's age is 6 years; what is the whole age?

12. The difference between $\frac{1}{4}$ and $\frac{1}{7}$ of another poet's age is 3 years; what is the age?

13. The difference between $\frac{1}{3}$ and $\frac{1}{5}$ of a certain missionary's age is 1 year; what is the age?

14. The difference between $\frac{1}{3}$ and $\frac{1}{11}$ of another missionary's age is 8 years; what is the age?

15. The difference between $\frac{1}{3}$ and $\frac{1}{13}$ of the age of a certain president of a college is 8 years; what is the whole age?

16. The difference between $\frac{1}{11}$ and $\frac{1}{8}$ of another president's age is 5 years; what is his age?

17. The difference between $\frac{1}{4}$ and $\frac{1}{12}$ of a certain philosopher's age is 14; what is the whole?

18. The difference between $\frac{1}{4}$ and $\frac{1}{10}$ of another philosopher's age is 5 years; what is his age?

19. The difference between $\frac{1}{3}$ and $\frac{1}{5}$ of a certain professor's age is six years; what is his age?

20. The difference between $\frac{1}{4}$ and $\frac{1}{3}$ of a certain clergyman's age is 4 years; what is his age?

Can you tell the names of the several persons referred to in the preceding questions?

[*Note.* They refer to persons whose names have already been mentioned.]



SECTION II.

1. Reduce $\frac{3}{8}$ to a lower term.

[*Note.* A quantity is reduced to lower terms when the same value is expressed in smaller figures; as $\frac{3}{8}$ make a whole one; of course $\frac{3}{8}$ being half of a whole one, reduced to lower terms is $\frac{1}{2}$.]

2. Reduce $\frac{3}{8}$ to lower terms.

3. Reduce $\frac{4}{12}$ to lower terms.

4. Reduce $\frac{1}{15}$ to lower terms.
5. Reduce $\frac{1}{18}$ to lower terms.
6. Reduce $\frac{1}{9}$ to lower terms.
7. Reduce $\frac{1}{8}$ to lower terms.
8. Reduce $\frac{1}{4}$ to lower terms.
9. Reduce $\frac{1}{4}$ to lower terms.
10. Reduce $\frac{1}{8}$ to lower terms.
11. $\frac{1}{8}$ of a dollar is the same as what?
12. $\frac{1}{2}$ of a shilling is the same as what?
13. $\frac{1}{3}$ of a yard is the same as what?
14. $\frac{1}{2}$ of a mile is the same as what?
15. $\frac{1}{8}$ of an acre is the same as what?
16. $\frac{1}{5}$ of a foot is the same as what?
17. $\frac{1}{6}$ of a bushel is the same as what?
18. $\frac{1}{2}$ of a rod is the same as what?
19. $\frac{1}{8}$ of a pound is the same as what?
20. $\frac{1}{2}$ of an hour is the same as what?



SECTION III.

1. If I had in my book-case as many more books as I now have, and half as many, I should have 100; how many have I?

2. If $\frac{1}{3}$ of the distance of Bethlehem south of Jerusalem be added to the distance, the sum will be 8 miles; what is the distance?

3. If the time of Jupiter's revolution about the sun be doubled, and $\frac{1}{4}$ of a revolution be added, the sum will be 27; what is the time of a revolution?

4. If $\frac{1}{3}$ of the reign of Queen Anne be added to her reign, the sum will be 20 years; how long was her reign?

5. If the reign of William the Conqueror be doubled, and $\frac{7}{8}$ of his reign be added, the sum will be 48 years; how long did he reign?

6. If the earth's diameter be doubled, and $\frac{1}{4}$ of the diameter be added, the sum will be 18,000 miles; what is the diameter?

7. $\frac{8}{9}$ of Jehoram's reign was 9 years; what was the length of his reign?

8. $\frac{1}{8}$ of Saul's reign was 60 years; how long did he reign?

9. $\frac{1}{8}$ of the price of a Bible is 3 dollars; what is the price?

10. If to Washington's age its half be added, and $4\frac{1}{2}$ years, the sum will be 105 years; how old was he when he died?

11. If the rise of the tide at New Haven be doubled, and $\frac{3}{8}$ of the tide be added, the sum will be 10 feet; how high does the tide rise?

12. If to the salary of the President of the United States $\frac{3}{8}$ be added, the sum will be 40 thousand dollars; what is his salary?

13. If the salary of the Post Master General be increased by its half and its third, the sum will be 11 thousand dollars; what is his salary?

14. If the salary of the Chief Justice of the Supreme Court of the United States be increased by its half and its tenth, the sum will be 8 thousand dollars; what is his salary?

15. If to the time that Westfield Academy has been in operation, its half, its fourth, and its eighth, were added, the sum will be 60 years; how long has it been in operation?

CHAPTER XII.

PROPORTION.



1. What number is as many times 3 as 4 is of 2?
2. What number is as many times 5 as 10 is of 2?

[*Notes.* When pairs of numbers are compared, the relation that exists between the numbers is called the ratio; and if the ratio of the pairs be equal, they are said to be proportional. Thus 2 has the same ratio to 6 that 4 has to 12, because 2 is $\frac{1}{3}$ of 6, and 4 is $\frac{1}{3}$ of 12; or $2 : 6 :: 4 : 12$ are proportional.]

3. 3 has the same ratio to 12, that 5 has to what?

4. 2 has the same ratio to 24, that 3 has to what?

5. If a stick 2 feet long cast a shadow 4 feet, a steeple 100 feet high will cast a shadow how long?

6. If a shadow 10 feet long is cast by a staff 2 feet high, then a shadow 50 feet long is cast by how high a staff?

7. George Washington was 6 feet high; his shadow at noon was in summer 2 feet; how long then was the shadow of a steeple 150 feet high?

8. If the interest of 2 dollars is 12 cents, what will be the interest of 10 dollars?

9. If the interest of 6 dollars be 8 cents, the interest of 18 will be what?

10. The Green Mountains are 4 thousand feet high, and the Teneriffe is as many times higher as 6 is greater than 2; how high is Teneriffe?

11. The fall in the Connecticut at Enfield is 30 feet; at South Hadley it is as many times great-

er, as 5 is greater than 3 ; what is the fall at South Hadley ?

12. The fall at Hanover. N. H. is as many times greater than at Enfield, as 6 is greater than 5 ; what is the fall at Hanover ?

13. The number of deaths in Westfield, Mass. is 200 in 6 years ; 3000, the whole population, will die in how many years ?

14. The number of deaths in Utica, N. Y. is 600 in 5 years ; the whole population, 8000, will die in how many years ?

15. The number of deaths in Northampton, Mass. is 188 in 4 years ; the whole population, 3600, will die in how many years ?

16. The number of deaths in Portsmouth, N. H. is 700 in 5 years ; the whole population, 8000, will die in how many years ?

17. The number of deaths in Portland, Me. is 736 in 4 years ; the whole population, 12,600, will die in how many years ?

18. The number of deaths in Rowley, Mass. is 142 in 5 years ; the whole population, 2000, will die in how many years ?

19. The number of deaths in Williamstown, Mass. is 1260 in 60 years ; how many in 5 years ?

20. The whole population of Williamstown, 2100, will die in how many years ?

21. The number of deaths in Stockbridge, Mass. is 147 in 7 years ; the whole population, 1600, will die in how many years ?

22. The number of deaths in New York city is 10,200 in 2 years ; the whole population, 200 thousand, will die in how many years ?

23. 5 ministers preached in Springfield 160

years ; if each preached the same length of time, how long did 3 preach ?

24. 6 ministers preached in West Brookfield 114 years ; if each preached the same length of time, how long did 2 preach ?

25. 4 ministers preached in Westfield 124 years ; how long did 3 preach ?

26. 7 ministers preached in New London, Ct. 161 years ; how long did 2 preach ?

27. 7 ministers preached in the Tabernacle church in Salem 91 years ; how long did 3 preach ?

28. If I burn 14 cords of wood in 12 weeks, how many shall I burn in 6 weeks ?

29. If tuition be 3 dollars for 11 weeks, how much will it be for 4 weeks ?

30. If the rent of a house, worth 12 hundred dollars, be \$60, what should be the rent of a house worth 2 thousand dollars ?

31. If I can write 3 pages in one hour, how long will it take me to write 17 pages ?

32. If I sleep in 12 weeks 126 hours more than is necessary, how many hours are foolishly slept away in 2 weeks ?

33. How much time is, at the same rate, foolishly spent in 1 day ?

34. If I gain 1 new idea, for every 10 minutes I study, how many shall I gain in $1\frac{1}{2}$ hour ?

35. If I would gain 3276 new ideas in 52 weeks, how many must I gain in 14 days ? in 1 ?

36. If I learn only 6 useful things in 3 weeks, how many shall I learn in 10 years ?

37. A man who is worth 15 hundred dollars, pays 8 dollars for taxes ; what will be the taxes of one worth 2000 dollars ?

38. 5 school teachers had 1500 dollars for one year's labor ; what did each receive per month ?

39. One town of 12 hundred people has 40 drunkards ; how many drunkards, then, in a town of 56 hundred ?

40. One town of 2 thousand people has 50 drunkards ; how many drunkards must there be at the same rate in a town of 50 thousand people ?

41. One thousand pounds of the ashes of oak wood produce 110 pounds of potash ; how many pounds of ashes produce 25 pounds of potash ?

42. 100 pounds of the ashes of fumitory produce 36 pounds of potash ; how much will 25 pounds produce ?

43. 50 pounds of the ashes of sallow produce 5 pounds of potash ; how much will 300 pounds produce ?

44. 8 pounds of the ashes of wormwood will produce 6 pounds of potash ; how much will 100 pounds produce ?

45. A human body, if baked until all moisture is evaporated, is reduced in weight as 1 to 10 ; a body that weighs 100 pounds living, will weigh how much when dry ?

46. In the Connecticut state prison 40 per cent. that is, 40 out of 100, cannot write ; how many out of 170 cannot write ?

47. 15 per cent. of the prisoners in the same prison cannot read ; how many out of 170 cannot read ?

48. 70 per cent. of the same prisoners lost their parents before they were 10 years old ; how many of the 170 grew up without parental care ?

49. 75 per cent. were intemperate when they

came to the prison ; how many of the 170 were intemperate ?

50. If 3 dollars will buy 9 bushels of oats, how many will 5 dollars buy ?

51. How many at the same rate will 2 dollars and 2 shillings buy ?

52. 4 of Hall's Geographies for children cost 1 dollar and 2 shillings ; what will 3 cost ?

53. 5 of the First Book in History cost 4 dollars and 1 half ; what will 2 cost ?

54. 9 sheets of colored gilt paper cost 36 cents ; what will 2 cost ?

55. 1 dozen lead pencils cost 75 cents ; what will 3 cost ?

56. 8 gallons of water weigh 60 pounds ; what will 20 gallons weigh ?

57. If 100 feet of hemlock boards cost 50 cents, what will 42 feet cost ?

58. If 100 feet of white pine boards cost 250 cents, what will 20 feet cost ?

59. If 2 barrels of flour cost 13 dollars, what will 10 barrels cost ?

60. If 100 people increase to 104 in one year, in how many years will they become 200 ?

61. If the population of a town double in 25 years, 1000 will increase how many in 10 years ?

APPENDIX.

Notes to Chap. I.

A.

BENJAMIN FRANKLIN was born in Boston, and became a very learned and useful man by studying while other boys were at play; he became rich by industry and temperance.

B.

HOMER lived in Greece about 3 thousand years ago; he was a school teacher and poet. He wrote two poems, one called the Iliad, which is an exhibition of bodily strength; the other called the Odyssey, which is an exhibition of the strength of the mind.

C.

LORD BYRON, son of an English Lord, became celebrated for his poetry; he gave himself up to early dissipation and excess, and the story of his vices has been published as extensively as his poetry.

D.

GEORGE WASHINGTON when a boy was noted for his strict adherence to truth, and punctuality in his engagements. He was appointed Commander in Chief of the American army during the war of the Revolution, and was the first President of the United States.

E.

NAPOLEON BONAPARTE was one of the greatest warriors the world has ever seen, but was stripped of his diadems and trophies, and ended his life on the Island of St. Helena, to which he was banished.

"Man's greatest glory ends in 'Here he lies.'"

F.

JOSEPH ADDISON lived in England; he was a very amiable man and a good writer. He published several volumes of papers called the Spectator; the object of which was to correct the follies and vices of his countrymen.

G.

MAHOMET was born in Arabia, and wrote a book called the Alcoran, which he impiously pretended was revealed to him from heaven. Many people in that part of the world believed it, and are called Mahometans.

H.

M. T. CICERO was a very eminent Roman orator and scholar; he wrote a great many books, and was much esteemed. He had some enemies who procured his banishment; soon after his return they cut off his head.

I.

TITUS LIVY is the oldest authentic writer of Roman history. He wrote the history of Rome from the second Punic war to the conquest of Macedonia.

J.

SALLUST was a writer of Roman history. He left a history of the conspiracy of Catiline and of the war of Jugurtha. He did not conduct always as he taught others to.

K.

OVID was a Latin poet of great learning; his most valuable poem is called *Metamorphoses*, or a view of the religion of the ancients.

L.

VIRGIL was born at Mantua, Italy, and is sometimes called the Mantuan bard. He wrote a very fine Latin poem called the *Æneid*, and another called the *Georgics*, which must be studied by all before they can go to college.

M.

STRABO wrote a geographical description of the Roman empire, as it was during the reign of Augustus.

N.

WILLIAM SHAKESPEARE is distinguished as a writer of dialogues. He lived in England; when a boy, he fell in company with bad boys, who stole some deer, and were punished; he was obliged to leave home; he went to London, and brought himself into notice by taking so good care of the horses of those that came to the theatre.

O.

JOHN KEPLER was a celebrated mathematician and astronomer, and a Professor in a German University.

P.

MARTIN LUTHER, a German Professor in the University of Wittemberg, in Saxony, is distinguished for taking the lead in the Reformation from the Catholic to the Protestant religion.

Q.

GALILEO, a native of Tuscany in Italy, is by some called the inventor of the telescope. He made some important discoveries in astronomy, and was imprisoned by the Pope for publishing his opinions on that science.

R.

THE GUNPOWDER PLOT was a plan of the Catholics to blow up the Parliament House of England, and kill the king and members of Parliament.

S.

THE IRISH REBELLION was a plot of the Irish Catholics to murder in one day all the Protestants in Ireland.

T.

PHILIP DODDRIDGE was an English clergyman, and author of a Commentary on the Bible, called the Family Expositor, and many other valuable books.

U.

DR. JAMES BEATTIE was Professor of Moral Philosophy at Aberdeen, and the author of a book on Intellectual Philosophy and a volume of poems.

V.

ERASMUS DARWIN was a physician in England, and wrote a book called Zoonomia, and a poem called the Botanic Garden. They are not now much read.

W.

JOHN ELIOT, in the early settlement of New England, was a missionary among the Indians near Boston. He was a very good man, and wrote the Bible in the language of the Indians, that they might read it.

X.

COLONEL GARDINER was born in England, and had a

pious mother; he enlisted in the army, and became a very wicked young man; he was shot through the neck in France, and almost died. He was afterwards eminent for his piety.

Notes to Chap. II.

A.

FREDERIC THE GREAT came to the throne of Prussia in 1740; he was a great warrior, but an irreligious and vicious man.

B.

EDMUND BURKE was born at Limes, in Ireland, was a member of Parliament, and a distinguished orator. There are many extracts in the school books from his speeches.

C.

WILLIAM PITT was one of the ablest statesmen of ancient or modern times; he held a conspicuous place in the English Parliament.

D.

ALEXANDER THE GREAT was a great warrior; he conquered the world, and wept because there were no more worlds to conquer. He then gave himself up to dissipation, and died in a fit of debauch.

Notes to Chap. III.

A.

SAMUEL BUTLER was the author of a singularly witty poem, called *Hudibras*.

B.

DR. ISAAC WATTS was an English clergyman, and wrote a volume of Psalms and Hymns, a work on Logic, on Astronomy, and several other books.

C.

SIR ISAAC NEWTON lived in England, and first introduced paper kites among school boys. He explained the doctrine of gravitation, and made many discoveries in natural philosophy.

D.

MISS FANNY WOODBURY died in Beverly, Mass. She was an eminently pious young lady. Her life is printed, and is a very interesting book for young ladies to read.

E.

MISS HANNAH ADAMS was a native of Massachusetts. She had a feeble constitution, and never went to school much; she studied and read by herself, and acquired much knowledge. She published several useful books.

F.

SAMUEL J. MILLS was born in Connecticut, was a minister, and one of the first in this country that devoted himself to labor for the salvation of the heathen. He died on board a ship coming from Africa to America, and his body was buried in the ocean.

G.

HENRY MARTYN was born in England, and went to Asia, as a missionary, and labored to instruct and save the heathen till he died.

H.

JOHN MILTON lived in England, wrote a poem called *Paradise Lost*, and several other books. He was blind, and could not write himself, but told others what to write.

I.

SIR WILLIAM JONES was born in Wales, and was a very learned man. He resided many years at Calcutta, and published a book called *Asiatic Researches*. He followed these two rules in his studies:—1. I will omit no opportunity for improvement; 2. What others have done, I can do.

J.

SAMUEL JOHNSON lived in England, and wrote a small Dictionary and a very large one; he wrote several other books.

K.

JOHN HOWARD lived in England; he was a very benevolent man, so much so that he is called the Philanthropist; he travelled over all Europe, visiting prisons, and laboring for the good of prisoners. He died in Russia.

L.

WILLIAM COWPER lived and died in England. He was a fine poet, and wrote several excellent poems. He was subject to great depression of spirits.

M.

PETER THE GREAT, emperor of Russia, travelled over Europe to learn the arts and sciences, that he might govern, civilize and enlighten a barbarous people. He worked in ship-yards abroad, and went home and taught his people to build ships. He is an example of what those who *try* can do.

N.

CHARLES XII. king of Sweden, was distinguished as a warrior. He fought against Peter the Great, and was killed in battle.

O.

JOHN WICKLIFF, an Englishman, called the Reformer, on account of his writing and preaching against the Catholics. He translated the Bible into English.

P.

CONSTANTINE, one of the Roman emperors, transferred the seat of empire from Rome to Byzantium, which ever since has been called Constantinople, or Constantine's city.

Q.

POMPEY was one of the triumvirate that governed Rome awhile; he finally quarrelled with Cæsar, and fought a battle at Pharsalus in Thessaly, was conquered, and fled to Egypt, where he was beheaded, and over his grave Cæsar erected a pillar called Pompey's Pillar.

R.

PLATO was one of the most eminent of Grecian philosophers. He was founder of the Academic sect; he taught that the human soul was a part of the Divinity.

S.

PERICLES was at the head of the Athenian republic for forty years. Athens reached her highest pitch of splendor during his reign.

T.

ARISTOTLE was the founder of the sect of Grecian philosophers called Peripatetics. His system of philosophy has exerted a great influence over the minds of men. When we study logic, we shall learn more about Aristotle.

U.

XENOPHON was a writer of Grecian history, and an amiable man. He wrote an account of the war of Cyrus the younger against his brother Artaxerxes, and also a history of Cyrus the elder.

V.

PHILIP was king of Macedon. He conquered Greece, and died by the hand of violence.

W.

CYRUS, king of Persia, famous for taking Babylon, and restoring the captive Jews.

Notes to Chap. IV.

A.

JOHN M. MEAD died in East Hartford, Ct. ; his life, a very interesting little book, has been published.

B.

THOMAS SPENCER was a clergyman in Liverpool, England. He was a very good man ; he was drowned.

C.

JOHN URQUHART lived and died in Scotland—he was a good scholar, and was preparing to go and preach to the heathen ; his memoir is a very interesting book.

D.

JOHN LOCKE, an eminent philosopher, was born and died in England. He was a man of feeble constitution, but lived to be old ; he drank only *water*. He spent the latter part of his life in studying the Bible.

E.

ROBERT POLLOK was born in Scotland of obscure parents ; he became a minister, and wrote a poem, called the *Course of Time*.

F.

CAROLINE SMELT lived in one of the Southern States ; she died a Christian. Her memoirs are printed—an interesting book for girls.

G.

HANNIBAL was a Carthaginian general, who fought in the Punic wars, and was celebrated for leading an army across the Alps.

Notes to Chap. V.

A.

CHARLES I., king of England, was beheaded in 1649. He had some good qualities, but was imprudent, and unfit to be a king.

B.

HENRY VI., another king of England, died in 1461. His reign is noted for the War of the Roses, so called because one party wore white roses on their hats, and the other, red. In this war 12 battles were fought, and 80 princes had their heads cut off.

C.

GEORGE I., another king of England, died of apoplexy, in 1727; he was from Hanover, in Germany. The kings of England since have been called also kings of Hanover.

D.

ELIZABETH was queen of England, and died in 1603. She was a learned woman, and well fitted to govern. She injured her reputation very much in causing Mary queen of the Scots to be put to death.

E.

MARY, commonly called the Bloody Mary, was sister of Elizabeth, and, before her, queen of England. In her short reign, 277 persons were burnt at the stake.

F.

HENRY III., king of England, died in 1272; a weak, irresolute man.

G.

OLIVER CROMWELL opposed Charles I. and succeeded him with the title of Protector. He was a man of great abilities, but despotic.

H.

JAMES II., king of England, died in 1688; he was a better sailor than king.

I.

HENRY IV., king of England, died in 1413; he was accounted a wise man, but rather severe.

J.

GEORGE III., king of England, died in 1820. No king of England reigned so long as he; the history of his reign is especially interesting to American youth.

K.

GEORGE IV., king of England, died in 1830. He was dissipated and weak minded.

Notes to Chap. VI.

A.

ÆSCHYLUS was a Greek poet; he wrote dialogues, took the prize at the Olympic Games, and died 456 years before Christ.

B.

SOPHOCLES was another Greek poet, who lived about fifty years after Æschylus.

C.

WILLIAM I., king of England, called the Conqueror, because he conquered Harold the Saxon king. He was a great hunter, and ambitious.

D.

HENRY V., king of England, died in 1442, distinguished for his bravery.

E.

CHARLES II., king of England, a son of Charles I., died in 1685. He was a corrupt and selfish king, caring more to please himself than his subjects.

F.

EDWARD I., king of England, died in 1307; he conquered Wales, and made it a part of his kingdom.

Chap. VII.

The notes to this chapter, referring to David, Ahaz, Jehoshaphat, Baasha, Moses, and Saul, Scripture characters, are omitted.

Notes to Chap. VIII.

A.

ALFRED, styled the *Great*, one of the kings of England, died in the year 899. He founded the University of Ox-

ford, built a fleet of 120 ships, and was a blessing to his country, and an ornament to mankind.

Notes B, C, D, and E, refer to Joshua, Samuel, Isaac, and Abraham, well known Scripture characters; for an account of whom see the Old Testament.

Notes to Chap. LX.

A.

GOLIATH was the champion of the Philistines, whom David slew. Read 1 Sam. chap. xvii.

B.

PHILIP of Mt. Hope was an Indian who lived in Rhode Island. About 1675, he excited the Indians to attempt to destroy all the white people in New England. The war continued about 3 years, when Philip was killed.

C.

ELIAS CORNELIUS, a clergyman, was secretary of the American Education Society, for many years; but at the time of his death, in 1832, he was secretary of the American Board of Commissioners for Foreign Missions.

D.

JEREMIAH EVARTS was educated a lawyer; but was afterwards secretary of the Am. Board of Commissioners until his death in 1831.

E. and F.

LEVI PARSONS and PLINY FISK were natives of Massachusetts, and missionaries to Palestine and Turkey.

G.

WILLIAM HERSCHEL was born in Germany, and died in England, in 1822. He was a celebrated astronomer: by the aid of a telescope 40 feet long, he made many valuable discoveries.

H.

ALEXANDER M. FISHER, one of the professors in Yale College, perished in the wreck of the ship Albion, on the coast of Ireland, in 1822.

I.

SOLOMON M. ALLEN, one of the professors in Middlebury College, was killed in 1817 by a fall from the top of one of the colleges.

K.

WILLIAM SHEPARD lived and died in Westfield, Mass. He was a colonel in the revolutionary war.

L.

JOSEPH WILLARD was president of Harvard College at Cambridge, and died in 1804. He was a man of great learning.

M.

TIMOTHY DWIGHT was born in Massachusetts, and died in 1817. He was a man of great learning, the president of Yale College, and author of several books.

N.

EBENEZER G. MARSH, Professor in Yale College, died at Wethersfield in 1803.

O.

THOMAS SCOTT was an English clergyman, who wrote a Commentary on the Bible. He died in 1821.

P.

ZEPHANIAH S. MOORE was born in Palmer, Mass., and settled in the ministry at Leicester. He was Professor at Dartmouth College, and President of Williams College, and afterwards of Amherst College, where he died, in 1823.

Q.

SIR HUMPHREY DAVY was a native of England; by industry and close application he made himself master of chemistry, and was the author of many important discoveries. He died at Geneva in 1830.

R.

ROGER SHERMAN was a native of Connecticut, born of poor parents, and learned the trade of a shoemaker. He was afterwards a member of Congress. Jefferson says, "he never said a foolish thing in his life."

S.

ELI WHITNEY was a native of Massachusetts. He resided at New Haven, was the inventor of the cotton gin, a machine for separating the seeds from cotton, and died in 1825.

T.

WILLIAM CAXTON was a native of England, and is distinguished for opening the first printing office in England.

Notes to Chap. X.

A.

JULIUS CÆSAR was a man of slender constitution, but of great industry. He overran Britain, Gallia, and Germany, with his army, fought a battle in Greece, and pursued his way to Egypt. He wrote a history of his wars, called Cæsar's Commentaries.

B.

CLEOPATRA was a sister of Ptolemy, king of Egypt. The battle of Actium was fought on her account; and, to avoid being led to Rome in triumph by the conqueror, she poisoned herself with an asp.

C.

SYLLA was a Roman of noble origin. He made himself master of the empire, and, after having slain a hundred thousand men, he died of a very filthy disease.

D.

CRASSUS was the richest man of all the Romans; he considered no man rich that could not support an army. He made war upon the Parthians to get their gold, in which he was killed. They took his dead body, and filled it with melted gold.

E.

NERO, one of the Roman emperors, was distinguished for his cruelty. He murdered his mother and his teacher, and burnt the city of Rome, to see the flames, and then charged the Christians with doing it, and cruelly tortured and put them to death.

F.

JOSEPHUS was a Jewish historian, who wrote the antiquities and destruction of his own country and people.

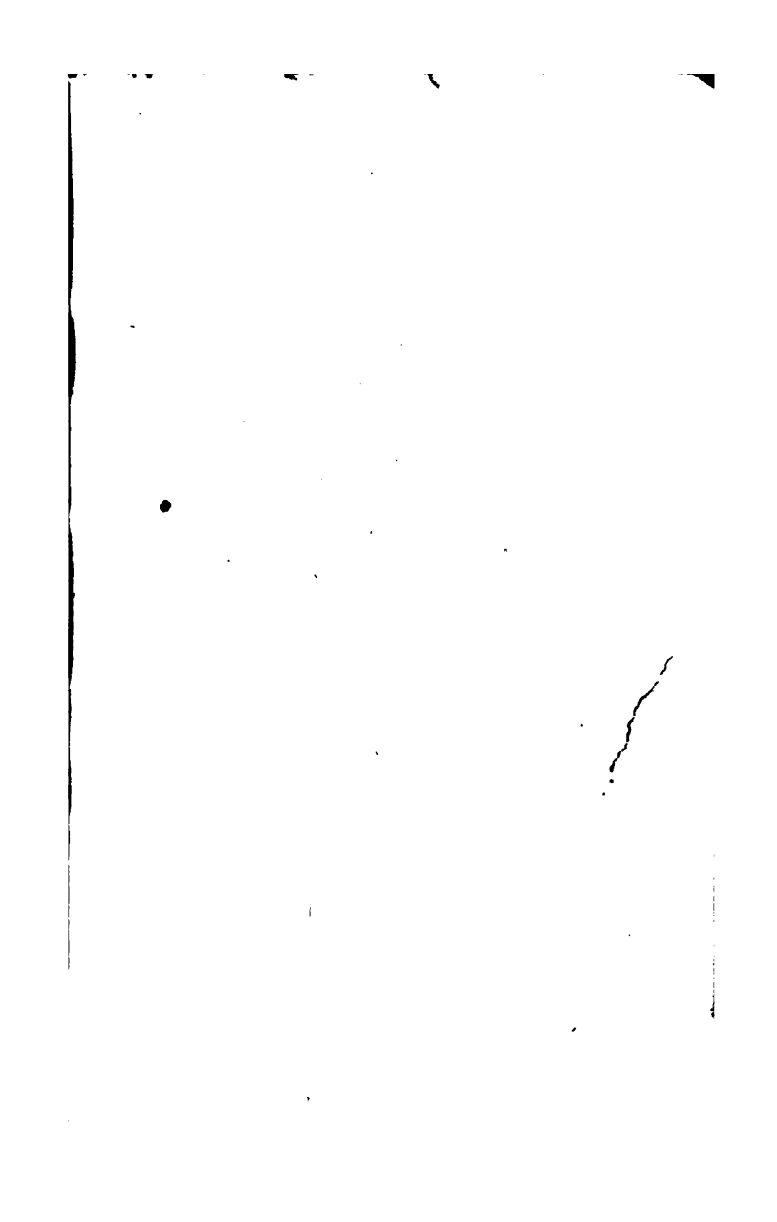
G.

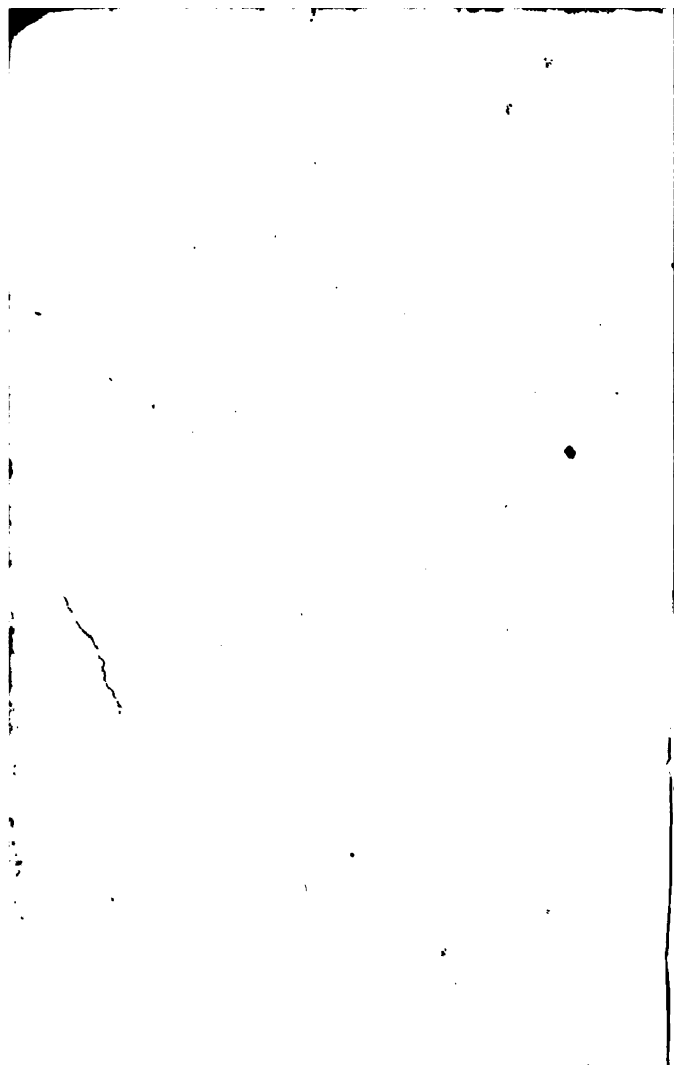
TACITUS was a Roman orator and historian, and governor of a Roman province. He wrote a book called the Annals of Tacitus, a record of events from the death of Augustus to the death of Nero.

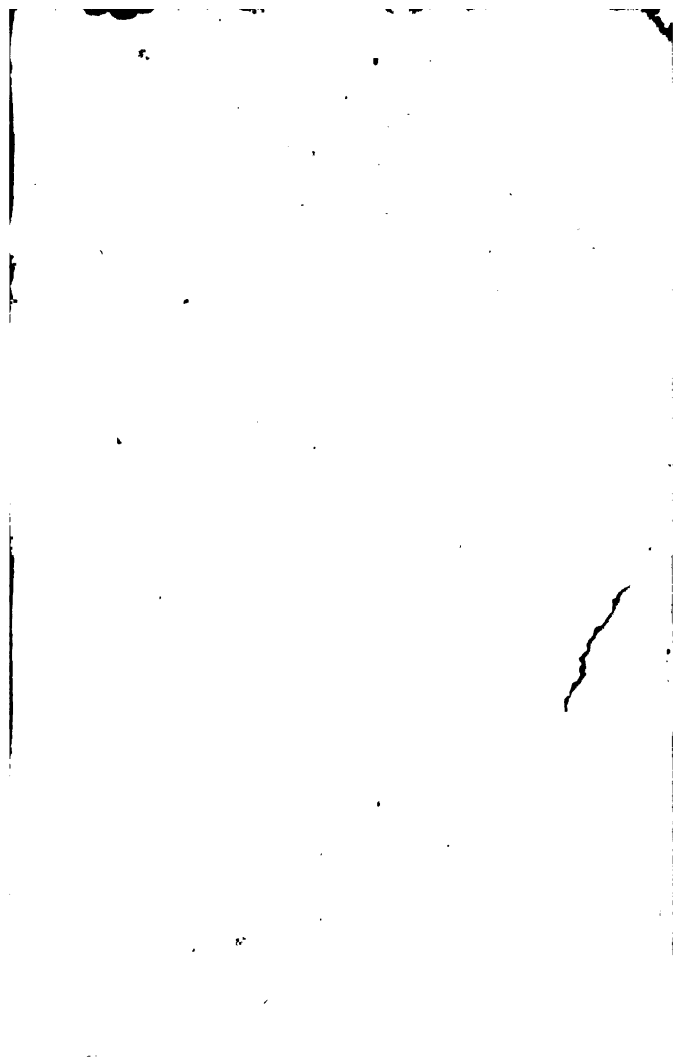
H.

CHRISTOPHER COLUMBUS was a native of Genoa. He early devoted himself to the study of geography, and was the discoverer of America.

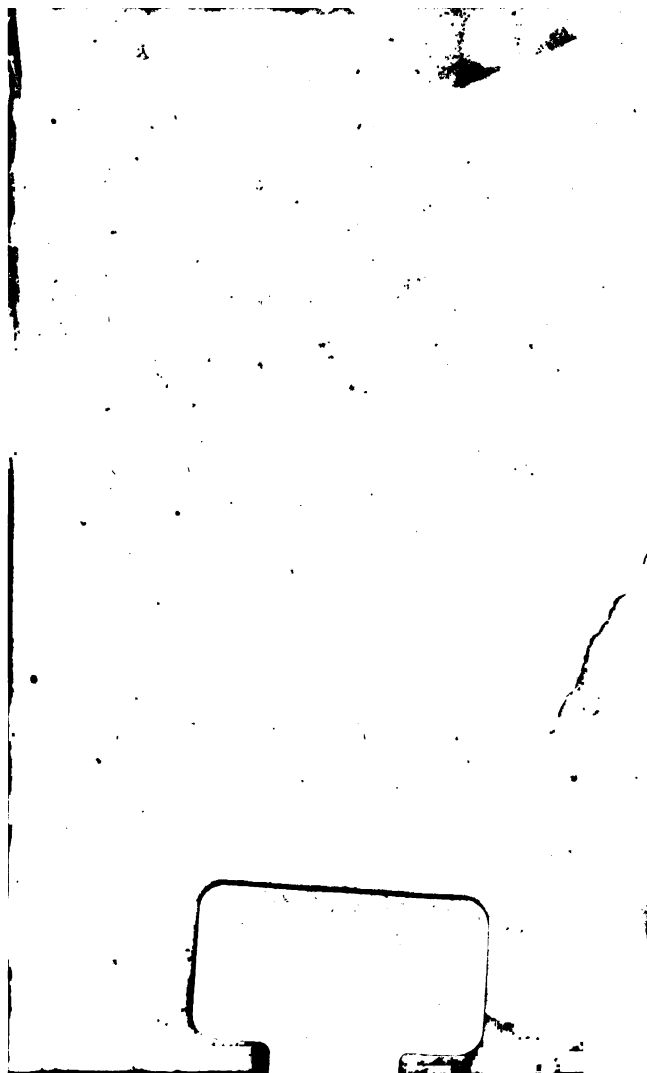
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